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ABSTRACT

This study examined teacher qualifications and out-of-field teaching using National Center for Education Statistics' Schools and Staffing Survey (SASS) data from 1988-00. It emphasized teachers without a major, minor, or certification in the subject taught and teachers without a major and certification in the subject taught. Overall, in middle school in 1999-00, 11-14 percent of students taking social science, history, and foreign languages, and 14-22 percent of students taking English, math, and science were in classes led by teachers without a major, minor, or certification. In high school in 1999-00, 5-10 percent of students in English, math, science, social science, arts and music, and physical education had teachers without these credentials. When examining teachers without a major or certification, out-of field teaching increased. About 6 out of 10 middle school students in English, foreign language, math, science, history, and ESL/bilingual education were taught by such teachers, while 6 out of 10 high school students in physical science, history, and ESL/bilingual education had these teachers. Middle schools had relatively fewer teachers with certification and in-field majors than high schools. Out-of-field teaching tended to decrease over time. Three appendixes present technical notes, detailed data tables, and standard error tables. (Contains 23 references.) (SM)

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Qualifications of the Public School Teacher Workforce:

Prevalence of Out-of-Field Teaching 1987-88 to 1999-2000

Statistical Analysis Report

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Qualifications of the Public School Teacher Workforce:

Prevalence of Out-of-Field Teaching 1987–88 to 1999–2000

Statistical Analysis Report

May 2002

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Introduction

Over the last 15 years, interest in student performance and teacher qualifications has intensified among educational policymakers and researchers. During this time period, research has accumulated that links student achievement to the qualifications of teachers (see Ferguson 1991, 1998; Goldhaber and Brewer 2000; Mayer, Mullens, and Moore 2000).[1] Two central measures of elementary and secondary teacher qualifications are teachers' postsecondary education and their certification. To understand how many students are taught by teachers lacking specified levels of training, efforts have focused on mismatches between teacher qualifications and their teaching assignments (National Commission on Teaching and America's Future 1996; Ingersoll 1999). Such mismatches are commonly referred to as out-of-field teaching. Mismatches might include, for example, teachers with a degree in English who are teaching classes in social science; or, conversely, teachers with educational backgrounds in the social sciences who are assigned to teach classes in reading.

One of the main findings concerning teacher qualifications has been the relatively high incidence of teachers teaching subjects outside their areas of subject matter training and certification (see, for example, Bobbitt and McMillen 1994; Ingersoll 1996, 1999, 2000; Neuschatz and McFarling 1999; Robinson 1985). Moreover, the incidence of so-called "out-of-field" teaching has been shown to vary by subject and by grade level. Out-of-field teaching also has been shown to occur more often in the classrooms of low-income students (Ingersoll 1999).

A number of researchers have explored the hypothesis that teachers' knowledge and ability are associated with student learning in the classroom. One of the earliest studies in this area is the Equality of Educational Opportunity (EEO) survey (Coleman et al. 1966), which found a positive relationship between teachers' verbal abilities and pupil performance. Over the last decade, there has been an increased interest in this area. In a 1991 analysis of Texas school districts, Ferguson used measures of teacher literacy as an indicator of the quality of schooling to conclude that one-quarter to one-third of district variation in student test scores was associated with differences in the quality of schooling. A 1992 study (Hanushek, Gomes-Neto, and Harbison, as cited in Monk 1994) used measures of teachers' subject matter knowledge and student learning gains, and found a positive relationship between how much teachers knew about the subject taught and their students' learning gains in that subject. In a 1994 analysis of student performance and the science and mathematics subject matter preparation of their teachers, Monk reported a positive relationship between student gains in performance and the number of courses their teachers had in the subject area taught. What is more, Monk also found that coursework in subject matter pedagogy (i.e., teaching methods) appears to contribute more to student performance than academic courses in the subject taught.

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[1] A possible link between teacher education and student achievement is one of the resource inputs considered in the meta-analysis debate between Hanushek and Hedges (see, for example, Hedges, Laine, and Greenwald 1994 and Hanushek 1994). Their findings on this dimension are at best mixed.

In more recent work, Goldhaber and Brewer's 1997 analysis of teachers' postsecondary degrees and students' mathematics performance found a positive relationship between these variables, with higher levels of student performance among students whose teachers held a bachelor's or master's degree in mathematics than among students whose teachers were out-of-field. Then, in 2000, Goldhaber and Brewer examined data on the postsecondary degrees and certification status of teachers, and their students' performance in mathematics and science. They observed a positive relationship between teachers' degrees and student performance in mathematics consistent with earlier findings.[2] They also found that students whose teachers were certified in mathematics but did not hold a postsecondary degree in mathematics did not perform as well as students whose teachers held a postsecondary degree in mathematics. These findings provide a foundation for further examinations of out-of-field teaching data.

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[2] The results for science showed no relationship between degree-specific training and student performance.

Data and Methods

The National Center for Education Statistics (NCES) is a major source of data regarding teacher qualifications in the United States. The NCES Schools and Staffing Survey (SASS) collects information on the educational backgrounds and professional credentials and teaching assignments of kindergarten through 12th-grade teachers in the United States. These data can be used to produce national estimates of out-of-field teaching by subject field. SASS data are based on nationally representative samples of America's schools, districts, principals, and teachers. SASS data were collected most recently over the 1999–2000 school year.[3] See appendix A for a discussion of the design and methodology of SASS data over the life of the survey.

Elements of Teacher Qualifications

Out-of-field teaching has been defined by examining two elements of teachers' qualifications: state certification status and postsecondary education. At first glance, one might assume that state certification to teach a subject field and grade level should provide a benchmark definition for in-field teaching. State credentials are typically based on postsecondary coursework in the field to be taught, as well as pedagogical coursework and student teaching with experienced teachers. However, since certification requirements vary considerably across states and over time, many analysts prefer to base their out-of-field measures on teachers' postsecondary education (Ravitch 1998). This report includes detailed data tables that can be used to examine out-of-field teaching based on postsecondary education and state certification, considered both separately and together.

Postsecondary Education

Policymakers and researchers agree that teachers should have undergraduate or graduate coursework in the fields they teach, but opinions differ over how much coursework a teacher needs to complete. Some argue that teachers should earn a major in any subject field they intend to teach (Ravitch 1998). Conversely, others argue that a minor in a field is sufficient (as described in Ingersoll 1999). As a result, this report includes data from all degrees attained at the bachelor's level or above for measures of major only and separately for measures of major or minor combined.[4] Further, given the positive research findings of Monk (1994) for coursework in subject matter pedagogy, and of Goldhaber and Brewer (1997, 2000) for academic subject matter majors, both subject matter education and academic degrees are included.

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[3] NCES' Fast Response Survey System (FRSS) has also collected data on out-of-field teaching. See Lewis et al. (1999).

Certification

To receive a "regular" or "standard" certificate for teaching a specific subject and grade level, all states require a bachelor's degree that includes subject matter as well as pedagogical studies; all but 10 states require basic skills tests in reading, mathematics, or in general knowledge; and 31 states require subject matter exams (U.S. Department of Education 2002).[5] Typically, states also provide novice teachers a "probationary" certificate that is based on the requirements of the standard certificate. Schools hiring and assigning teachers accept this certificate in lieu of the standard certificate with the expectation that the teacher will earn the standard certificate in due time through full-time teaching in the school. This report combines data on probationary, standard, and advanced certificates in determining teacher certification status.[6]

Teacher Qualification Measures Featured in This Report

Those who argue that a major in the subject taught is the most appropriate measure of a teacher's qualifications might opt to exclude certification status or minors in the subjects taught from their analyses of in-field and out-of-field teaching. However, few would argue that teachers who have neither certification nor training in a subject are sufficiently equipped to teach in that subject. As a result, this report focuses on two measures:

- Teachers without a major, minor, or certification in the subject taught and
- Teachers without a major, and certification in the subject taught.[7]

Depending on the focus of the analysis, the teachers in both of these measures can be identified as out-of-field. The teachers in the first measure lack any of the earned credentials that researchers have identified as indicators of teacher qualifications. The teachers in the second measure lack the two earned credentials that researchers have identified as elements of teacher qualifications that are associated with high student performance.

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[4] Coursework in pursuit of either an academic major or a subject specific education major is included in these measures.

[5] The amount of subject matter and pedagogical studies required varies across states and across grade levels. For example, in some states, middle grade teachers are certified to teach across subjects (i.e., hold a K–9 elementary certification), while in other states, a grade 7–12 subject specific certification is required in some grades.

[6] A small percentage (3.3 percent) of America's public school teachers hold provisional certificates. However, variations across states in the requirements for these provisional certificates make it difficult to use them as a measure of teacher qualifications.

[7] Details describing the matching of degree fields to certification fields and to subject fields taught may be found in appendix A.

Measures of Out-of-Field Teaching

The SASS data provide the basis for analyzing out-of-field teaching in several different ways. For instance, one focus might be on teachers and the extent to which teachers are assigned to teach classes outside their areas of preparation. This information could provide answers to questions such as: How often are teachers assigned to teach courses outside the areas for which they have been trained? In what fields are teachers most often assigned to classes outside their areas of preparation? SASS data allow analyses of teachers' qualifications in their reported main assignment fields (the subjects in which they teach the most classes), as well as in each different subject that they teach.

Alternatively, the focus might be on the extent to which students are taught by out-of-field teachers. A focus on students could provide insight into the quality of instruction provided to students by answering questions such as: How often are students in U.S. classrooms exposed to instruction from teachers who do not have postsecondary training or certification in the subject area taught?

Four Out-of-Field Teaching Measures

Based on SASS data, four approaches to measuring out-of-field teaching can be used to address these questions: teachers out-of-field by main teaching assignments, teachers out-of-field by each subject taught, classes taught by out-of-field teachers, and students taught by out-of-field teachers. The focus of this report is on measuring students' exposure to out-of-field teachers; thus, this report focuses on the measure for students taught by out-of-field teachers. In addition, detailed tables for all four approaches are included in appendix B, and appendix A includes a description of each of the four approaches.

The Out-of-Field Measure Featured in This Report: Students Taught by Out-of-Field Teachers

The measure for students taught by out-of-field teachers tracks the number of students taught by teachers who are in-field or out-of-field in a specific subject. The "students taught" measure provides the most targeted assessment of the extent to which students are exposed to underqualified teachers. This measure allows analysts to report the *percentage of all students taught each subject by teachers who are teaching outside their areas of preparation.*[8]

Reporting Out-of-Field Teaching by Grade Level

Differences in school and class organization at the elementary, middle, and high school levels require a separate consideration of out-of-field teaching by level of instruction. At the elementary level, the available data do not support estimates of the percent of students taught by out-of-field teachers. However, data on the teacher-based measure of out-of-field teaching in the main assignment field are included in detailed tables B1 and B10 in appendix B and discussed in appendix A. Inasmuch as class rotations, or departmentalized instruction, are limited in the early grades, this measure provides a reasonable proxy of student exposure to teachers with different levels of qualifications.

Policymakers and researchers have increasingly examined the middle school grades as an important, separate level of instruction (see Alt, Choy, and Hammer 2000; Levine, McLaughlin, and Sietsema 1996; Lewis et al. 1999). For most students, the middle grades mark their first experiences with departmentalized instruction, in which students move between classrooms from teacher to teacher and subject to subject. Thus, the middle grades serve as an introduction to the secondary years of schooling. Previous research on out-of-field teaching has found substantial differences in the extent of out-of-field teaching between the middle grades and the high school grades. In particular, Ingersoll (1999) found higher rates of out-of-field teaching in middle grades compared with the high school grades.

At the high school level, most teachers are assigned to subject area departments and teach a single subject or several subjects to multiple classes throughout the school day. Although actual rates of out-of-field teaching are lower at the high school level than at the middle school level, the wide range of subjects and classes at the high school level makes the potential for out-of-field teaching high. Moreover, the instructional content at the high school level can extend well beyond the introductory level of content in a given subject area. Therefore, a teacher without adequate preparation in a specific subject area may have greater difficulty teaching the content effectively at the high school level than at the middle school level.

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[8] Since SASS is a sample of teachers rather than students, technically the measure is the percentage of teachers' students who are in classes with a teacher teaching outside their field. For ease of presentation, this will be referred to as the percentage of students who are in classes with a teacher teaching outside their field.

The course content and educational contexts are so different between the elementary, middle, and high school years that reporting them together would disguise important differences in out-of-field teaching. Thus, it is important to report out-of-field teaching estimates separately for all three levels.[9] Teachers were categorized based on the range of grades taught and main assignment field. The elementary grades, K–4, include those teaching in these grades exclusively, and those who teach some combination of grades K–9 with a main assignment field of elementary education or special education. The middle grades, 5–8, include those teaching some combination of grades K–9 and having a main assignment field other than elementary education or special education and not teaching any grades higher than 9. The high school grades, 9–12, include those teaching grade 9 only and those teaching any grades 10 or higher.[10]

Reporting on Out-of-Field Teaching Over Time

This report includes SASS data collected from public school teachers over 4 school years (1987–88, 1990–91, 1993–94, and 1999–2000) that span a 13-year period.[11] Although the data from the three earlier administrations of SASS have been published previously, there has been variability over time in different aspects of the definitions used. A portion of this variability has resulted from differences in the surveys used. These changes impact slightly the matches that are made between teachers' majors and minors and the subjects they teach. A larger source of variability has resulted from analysts' choices concerning the credentials used to match with subjects teachers teach, the teachers to include, and the definitions of grade ranges. Thus, in preparing the data for this analysis, considerable care was taken in developing a consistent set of definitions that were applied to the data from each administration of SASS to allow for an analysis of changes in these measures over the last 13 years.

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[9] Although detailed tables are provided for all levels, this report focuses on the data for the middle and secondary levels.

[10] See the technical notes in appendix A for details on the assignment of teachers to levels.

[11] The 1999-2000 population of public school teachers includes public charter school teachers (see appendix A for a detailed discussion of public charter schools).

Findings

The student-based measure of out-of-field teaching discussed here provides estimates of students' exposure to teachers with different levels of qualifications. The measure of students taught by teachers without a major, minor, or certification in the subject taught provide estimates of the percentage of students in each subject whose teachers lack the minimal level of qualifications deemed necessary for teaching a specific subject. The measure of students taught by teachers who do not have both a major and certification in the subject taught provides subject-specific estimates of the percentage of students whose teachers do not have the two credentials that are most likely to help their students excel. The data are presented separately for the middle grades and the high school grades. All differences cited are significant at the 0.05 level. All data discussed in these findings are included in table 1; in addition, related data for school years 1990–91 and 1993–94 can be found in detailed tables B-8, B-9, B-17, and B-18.

Teachers without a Major, Minor, or Certification

Middle Grades—5–8

In the middle grades for school year 1999–2000, between 11 and 22 percent of the students enrolled in English, mathematics, science, foreign language, social science, and the subfield of history were in classes led by teachers without a major, minor, or certification in the subject taught, compared to less than 5 percent of the middle-grade students in arts and music and in physical education/health education classes.[12] In contrast, between 29 and 40 percent of the middle-grade students enrolled in biology/life science, physical science, or ESL/bilingual education classes had teachers who lacked a major, minor, or certification in the subject taught. Although there was a decrease in the percent of middle-grade students in physical education/health education classes that were led by teachers without any of these credentials, between school years 1987–88 and 1999–2000, there was no measurable change between these school years in the percent of middle-grade teachers lacking credentials in any of the other subjects examined.

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[12] This analysis is limited to those students in the middle grades who are in a departmentalized setting; student counts are not available for individual self-contained classrooms. In addition, the matches for foreign language and arts and music require exact matches between teacher training and courses taught (see appendix A for details).

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Table 1.—Percentage of public school students by grade levels taught and teacher's qualification status in course subject area: 1987–88 and 1999–2000

	Middle grades				High school grades			
	No major and certification		No major, minor, or certification		No major and certification		No major, minor, or certification	
Subject field	1987–1988	1999–2000	1987–1988	1999–2000	1987–1988	1999–2000	1987–1988	1999–2000
English	64.6	58.3	19.5	17.4	38.2	29.8	13.0	5.6
Foreign language	—	60.7	—	13.8	—	47.6	—	11.1
Mathematics	69.9	68.5	17.2	21.9	37.4	31.4	11.1	8.6
Science	62.4	57.2	16.3	14.2	31.4	27.3	8.1	5.5
Biology/life science	70.0	64.2	32.9	28.8	47.7	44.7	9.3	9.7
Physical Science	92.9	93.2	43.0	40.5	70.2	63.1	30.9	15.5
Chemistry	—	—	—	—	62.9	61.1	16.8	9.4
Geology/earth/space science	—	—	—	—	83.2	78.6	50.9	36.3
Physics	—	—	—	—	81.6	66.5	40.3	17.0
Social science	48.3	51.1	12.7	13.3	33.7	27.9	7.5	5.9
History	67.5	71.0	15.2	11.5	62.1	62.5	13.0	8.4
ESL/bilingual education	80.5	72.9	41.2	36.1	88.7	70.8	54.4	31.1
Arts and music	[illegible]	15.0	2.0	2.5	15.7	19.6	3.3	5.0
Physical education	22.2	18.9	5.8	3.4	24.8	19.1	5.6	4.5

—Not available

NOTE: Middle level teachers include teachers who taught students in grades 5–9 and did not teach any students in grades 10–12; teachers who taught in grades 5–9 who identified themselves as elementary or special education teachers were classified as elementary teachers. High school teachers include all teachers who taught any of grades 10–12, as well as teachers who taught grade 9 and no other grades. Not all assignment areas were measured in each SASS administration. See appendix A for notes and definition of terms.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 "Public Teacher Survey," 1999–2000 "Public Teacher Survey," and 1999–2000 "Public Charter Teacher Survey."

High School Grades—Grades 9–12

In the 1999–2000 school year, between 5 and 7 percent of the high school students enrolled in English, science, social science, arts and music, and physical education/health education classes, 9 percent of the high school students enrolled in mathematics, and 11 percent of the high school students enrolled in foreign language classes were in classes led by teachers without a major, minor, or certification. In contrast, 31 percent of the students in ESL/bilingual education classes had teachers who did not have a major, minor or certification in the field.

In some fields, teachers may have a general degree and certification or a degree and certification in one specific subfield. For example, data reported for the broad category of science include matches between teacher credentials in general science or any science subfield as legitimate. However, since teacher credentials in the specific subfield may be more important to student success in that subfield, where available, data are presented for subfields as well. When the specific subfields of social science and science are considered separately, between 8 and 10 percent of the high school students in history, chemistry, and biology/life science, 17 percent of the students in physics, and 36 percent of the students in geology were found to have had teachers who lacked credentials in the specific subfield taught in the 1999–2000 school year.

There were measurable decreases in the percent of high school students enrolled in classes with teachers without the recognized credentials in a number of fields.[13] The percent of high school students enrolled in classes with teachers without an in-field major, minor, or certification in English, mathematics, social science (including the subfield history), ESL/bilingual education, science (including physical sciences (as a group), and the specific subfields of chemistry, geology, and physics) decreased between school years 1987–88 and 1999–2000. The only increase in high school students' exposure to teachers lacking the specified credentials occurred in arts and music, where, in school year 1999–2000, despite the increase, it remained the case that 95 percent of the high school students enrolled in arts and music classes were in classes led by teachers with at least one of these credentials in the specific area of arts and music taught.

Teachers without a Major and Certification

Middle Grades—Grades 5–8

In the 1999–2000 school year, at least two-thirds of the students in middle-grade mathematics classes (69 percent) and ESL/bilingual education classes (73 percent) had teachers who did not report a major and certification in the subject taught. Approximately 60 percent of the students in middle-grade English classes (58 percent), foreign language classes (61 percent), and science classes (57 percent) had a teacher who did not report a major and certification in the subject taught. By comparison, although the estimate for the specific subfield of biology/life science (64 percent) is similar to the percent for all science classes, most students in middle-grade physical science classes (93 percent) had teachers who did not have certification along with a major in any of the physical sciences or in physical science education. About one-half of the students in middle-grade social science classes (51 percent) had teachers who did not have a major and certification in the field, but 71 percent of the students in middle-grade history classes had teachers who did not report having a major in history or world civilization and certification in the field.

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[13] Methodological differences, including differences in survey formats over the years, do not appear to have a major impact on change over time on the estimates.

In contrast, fewer students enrolled in classes in arts and music and in classes in physical education and health had teachers who did not hold a major and certification in the field taught. Only 15 percent of the middle-grade students in arts or music classes had teachers who did not report a certification along with a major in their specific subfield; and only 19 percent of the middle-grade students in physical education or health classes had teachers who did not have a certification and a major in a physical education or health education field.

Over the 13-year period from school year 1987–88 to school year 1999–2000, there were decreases in the percent of middle-grade English teachers who did not hold certification and a major in the subject taught; however, in 1999–2000, it remained the case that 58 percent of the middle-grade English students had teachers who did not have a major and certification in the field. For the other subjects examined, there were small apparent fluctuations over this time period, but there were no measurable differences over time. Approximately 70 percent of the middle-grade students in mathematics classes and 60 percent of the middle-grade students in science classes had teachers who did not have a major and certification in the subject taught. In contrast, only 15 to 22 percent of the middle-grade students in arts and music and in physical education or health classes had teachers who had not majored and were not certified in their teaching field.

High School—Grades 9–12

In the 1999–2000 school year, one-third or fewer of the high school students in English, mathematics, science, social science, arts and music, and physical education/health education classes had teachers who did not have a major and certification in the subject taught. In contrast, 71 percent of the high school students in ESL/bilingual education classes had teachers who did not have a major and certification in ESL/bilingual education. And 48 percent of the students in foreign language classes had teachers who did not have a major and certification in the specific language taught.

Despite the relatively small amount of out-of-field teaching evident in the general fields of science and social science in school year 1999–2000, a different profile emerges when individual subfields are considered separately. Although 27 percent of the high school students in science classes had teachers without a major and certification in any field of science, the percentages were much higher for each specific subfield. Thus, 45 percent of high school students in biology/life science classes had teachers who did not have certification and a major in biology/life science. About 63 percent of the high school students in physical science classes had teachers who did not have certification and a major in some area of physical science. The percentages are similar for the subfields of chemistry (61 percent) and physics (67 percent); but there were relatively fewer geology teachers without these credentials, with about three-quarters of the students (79 percent) in high school geology enrolled in classes led by teachers without certification and a major in geology (see table B-5 for teacher data). Similarly, although 28 percent of high school students in social science classes had teachers without a social science major and certification of some type, 63 percent of the high school students in history classes did not have teachers with a major and certification in history or world civilization.

Although one-third or fewer of the high school students in English, mathematics, and social science classes had teachers who did not have a major and certification in the subject area taught, over the 13-year period from school year 1987–88 to school 1999–2000 the percent of students in classes led by teachers who did not have an in-field major and certification decreased in each of these fields. Similarly, there were decreases in the percentages of high school students in physics, ESL/bilingual education, and physical education/health education classes with teachers who did not have an in-field major and certification. The apparent decrease in the percentage of high school students in science classes was not significant. Although there was an increase for arts and music, 20 percent of the high school students enrolled in these classes had teachers without an in-field major and certification in the specific subfield taught in 1999–2000.[14]

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[14] Any apparent changes in the other fields were not statistically significant. In addition, the matches for foreign languages and arts and music require exact matches between teacher training and courses taught (see appendix A for details).

Discussion and Summary

The two measures of teacher qualifications featured in this report provide different perspectives on out-of-field teaching. Teachers who do not have a major, a minor, or certification in the subject taught can, most certainly, be classified as out-of-field teachers. In the middle grades in 1999–2000, some 11 to 14 percent of the students taking social science, history, and foreign languages, and 14 to 22 percent of the students taking English, mathematics, and science were in classes led by teachers without any of these credentials. In addition, approximately 30 to 40 percent of the middle-grade students in biology/life science, physical science, or ESL/bilingual education classes had teacher lacking these credentials.

In the high school grades in 1999–2000, between 5 and 10 percent of the students in classes in English; mathematics; science and the subfields of biology/life science and chemistry; social science and the subfield of history; arts and music and physical education had teachers who were without a major, a minor, or certification in the field taught, and thus are considered out-of-field by this measure. Within the subfields of science, 17 percent of the high school students enrolled in physics and 36 percent of those enrolled in geology/earth/space science were in classes led by out-of-field teachers. In addition, 31 percent of the high school students enrolled in ESL/bilingual education classes had out-of-field teachers.

When the definition of out-of-field is expanded to include teachers who do not hold certification and a major in the subject taught, the amount of out-of-field teaching increases. With this measure, at a minimum 6 out of every 10 middle-grade students in classes in English; foreign languages; mathematics; science, including the subfields of biology/life science and physical science; history; and ESL/bilingual education were in classes led by out-of-field teachers in 1999–2000. The proportions were higher for some subjects, with 73 percent of the students enrolled in ESL/bilingual education classes, 69 percent of the middle-grade students enrolled in mathematics, 71 percent in history, and 93 percent of the students enrolled in physical science in classes led by teachers without majors and certification in these fields.

At the high school level in 1999–2000, at a minimum 6 out of every 10 students enrolled in physical science, including the subfields of chemistry, geology/earth/space science, physics; history; and ESL/bilingual education classes had teachers who did not have certification and a major in the subject taught, and thus are considered out-of-field by this measure. In addition, 45 percent of the high school students enrolled in biology/life science, and approximately 30 percent of those enrolled in mathematics, English, and social science classes had out-of field teachers using this measure.

A comparison between the experiences of students in the middle grades and those in the high school grades shows that there were relatively fewer teachers with certification and an in-field major in the middle grades than in the high school grades in English; mathematics; science, including the subfields of biology/life science, and physical science; and social science over the 13-year period. That is to say, compared to the high school grades, higher percentages of students in the middle grades were in classes led by teachers who did not hold certification and a major in the subject taught. Similarly, higher percentages of students taking these subjects in the middle grades were in classes led by teachers without any of the recognized credentials. Whether it is because a general elementary certification or training is thought to be sufficient in the middle grades, or because teacher specialization in the middle grades has not caught up with the move toward changing classes in the middle grades, teachers who teach specific subjects in the middle grades are less likely to have the recognized credentials than their contemporaries teaching in the high school grades (see tables B–4 and B–5 for more detail on teachers).

A comparison of the student experiences over the 1987–88 to 1999–2000 period shows that in the middle grades there were decreases in the percent of students taught English and science by teachers who did not have certification and a major in the subject taught, and there was a decrease in the percent of students in physical education/health education classes that were led by teachers without any of the recognized credentials (i.e., no major, minor, or certification). More changes were evident in the high school grades, where there were improvements evident in a number of fields—with decreases in the percent of students taught by teachers who did not have both a major and a certification in the subject taught in English, mathematics, the science subfields of physical science and physics, social science, ESL/bilingual education, and physical education/health education. There was an increase in the percentage of students in arts and music classes with teachers without a major and certification in the specific subfield taught, but in

1999–2000 this only affected 20 percent of the students. Decreases were also evident in the percent of students who were taught by teachers without any of the recognized credentials in English; mathematics; science and each of the subfields—physical science, chemistry, geology, physics; social science and the subfield history; and ESL/bilingual education. The only increase in the high school grades was in arts and music, where the percentage of students taught by teachers without a major, minor, or certification went from 3 percent in 1987–88 to 5 percent in 1999–2000.

There was one pattern that was similar across both the middle and high school grades: the arts and music teachers and the physical education/health education teachers were the most likely of all the subject matter teachers to have certification and a major in the subject taught. And in the middle grades these teachers were also the least likely to lack a major, minor, or certification. Whether this is the result of the specific requirements to teach in these fields or a matter of supply and demand remains a topic for further study.

References

Alt, N., Choy, S.P., and Hammer, C.H. (2000). *In the Middle: Characteristics of Public Schools With a Focus on Middle Schools* (NCES 2000–312). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Bobbitt, S.A. and McMillen, M.M. (1994). *Qualifications of the Public School Teacher Workforce: 1988 and 1991* (NCES 95–665). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Coleman, J.S., Campbell, E.Q., Hobson, C.J., McPartland, J., Mood, A M., Weinfeld, F.D., and York, R.L. (1966). *Equality of Educational Opportunity*. U.S. Department of Health, Education, and Welfare. Washington, DC: U.S. Government Printing Office.

Feistritzer, C.E., and Chester, D T. (1999). *Alternative Teacher Certification: A State-by-State Analysis 1998-99*. Washington, DC: National Center for Education Information.

Ferguson, R.F. (1991). Paying for Public Education: New Evidence on How and Why Money Matters. *Harvard Journal on Legislation, 28*(2): 465–498.

Ferguson, R.F. (1998). Can Schools Narrow the Black-White Test Score Gap? In C. Jencks and M. Phillips (Eds.), *The Black-White Test Score Gap* (pp. 318–374). Washington, DC: The Brookings Institution.

Goldhaber, D.D., and Brewer, D.J. (1997). Why Don't Schools and Teachers Seem to Matter? Assessing the Impact of Unobservables on Education. *Journal of Human Resources32*: 505–523.

Goldhaber, D.D., and Brewer, D.J. (2000). Does Teacher Certification Matter? High School Certification Status and Student Achievement. *Educational Evaluation and Policy Analysis, 22*(2): 129–145.

Hanushek, E.A. (1994). Money Might Matter Somewhere: A Response to Larry V. Hedges, Richard D. Laine, and Robert D. Greenwald. *Educational Researcher, 23*(4): 5-8.

Hedges, L.V., Laine, R.D., and Greenwald, R. (1994). Does Money Matter? A Meta-Analysis of Studies of the Effects of Differential School Inputs on Student Outcomes. *Educational Researcher, 23*(2): 5–14.

Ingersoll, R. (1996). *Out-of-Field Teaching and Educational Equality* (NCES 96–040). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Ingersoll, R. (1999). The Problem of Underqualified Teachers in American Secondary Schools. *Educational Researcher, 28*(2): 26–37.

Ingersoll, R. (2000). Rejoinder: Misunderstanding the Problem of Out-of-Field Teaching. *Educational Researcher, 30*(1): 21–22.

Jackson, A., and Davis, G. (2000). *Turning Points 2000: Educating Adolescents in the 21st Century.* New York, NY: Teachers College Press.

Lewis, L., Parsad, B., Carey, N., Bartfai, N., Farris, E., Smerdon, B, and Greene, B. (1999). *Teacher Quality: A Report on the Preparation and Qualifications of Public School Teachers* (NCES 1999–080). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Mayer, D.P., Mullens, J.E., and Moore, M.T. (2000). *Monitoring School Quality: An Indicators Report* (NCES 2001–030). U.S. Department of Education. National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Monk, D.H. (1994). Subject Area Preparation of Secondary Mathematics and Science Teachers and Student Achievement. *Economics of Education Review, 13*(2): 125–145.

National Commission on Teaching and America's Future. (1996). *What Matters Most: Teaching for America's Future. Report of the National Commission on Technology & America's Future. Summary Report.* New York: Author.

National Reading Panel. (2000). *Report of the National Reading Panel: Teaching Children to Read: An Evidence-Based Assessment of the Scientific Research Literature on Reading and Its Implications for Reading Instruction.* Rockville, MD: National Institutes of Health.

Neuschatz, M. and McFarling, M. (1999). *Maintaining Momentum: High School Physics for a New Millennium.* College Park, MD: American Institute of Physics. Available at www.aip.org/statistics.

Ravitch, D. (1998, August 10). Lesson Plan for Teachers. *The Washington Post*, A17.

Robinson, V. (1985). *Making Do in the Classroom: A Report on the Misassignment of Teachers.* Washington, DC: The Council for Basic Education.

U.S. Department of Education. (2002). *Meeting the "Highly Qualified Teachers" Challenge: The Secretary's Annual Report on Teacher Quality.* Washington, DC: U.S. Government Printing Office.

Appendix A: Technical Notes

I. Measures of Out-of-Field Teaching

Measure 1: Teachers In- or Out-of-Field by Main Assignment

Much of the recent research and policy attention concerning out-of-field teaching has been based on analyses of teachers' qualifications in their self-reported main assignment fields (see, for instance, National Commission on Teaching and America's Future 1996). Teachers' main assignments are typically defined as the field in which a teacher teaches the most classes. The "main assignment" measure indicates the percent of teachers who are teaching in-field or out-of-field in their main assignment. These measures are typically reported separately for each academic subject area. Thus, the measure provides estimates of the extent of out-of-field teaching in mathematics, science, and other subject areas *among teachers with main assignments in those areas*.

However, many teachers teach one or more classes outside their main assignments, which means that while they are in-field in their major assignment field, they teach outside their areas of preparation as well. Therefore, measuring the extent to which teachers teach outside their areas of expertise only in their main assignments may underestimate out of-field teaching. The main assignment measure fails to capture the teaching that occurs outside of teachers' main assignments. Furthermore, some teachers may have difficulty identifying their main assignment. For instance, the SASS uses teachers' self-reports of main assignments, and asks respondents who teach two main assignments equally to simply choose one and to report the other as an "other" assignment. This measure also provides no direct data on the extent to which students are exposed to out-of-field teachers.

One major advantage of the main assignment measure is that it can be calculated for all teachers. It is relatively straightforward to ask teachers to report their main assignments and then compare their qualifications against their main assignments. Each of the other three measures requires teachers to report the subject area for each class taught. It is difficult for some teachers to report the number of classes and students they teach in each subject area. For example, teachers who provide specialized instruction for students through the "pull-out" of students from regular classrooms may provide instruction that crosses subject areas.[15] Special education teachers often teach in this manner. Teachers who provide instruction in these settings may also have difficulty reporting the number of separate classes or the number of individual students they teach. Therefore, although the main assignment measure underreports out-of-field teaching when teachers have more than one assignment field, the main assignment measure can be reported for all teachers. Furthermore, the main assignment is the most appropriate measure for teachers who teach in a self-contained classroom.[16]

Measure 2: Teachers In- or Out-of-Field by Each Subject Area Taught

Similar to the main assignment measure, the "each subject area taught" measure also focuses on teachers, but it goes beyond the main assignment field measure by considering *each of the subject areas taught*—rather than just a teacher's main assignment. Thus, teachers' credentials are compared with their assignments in each subject area they teach. With this measure, the analyst can report "among all teachers teaching at least one science course, XX percent are teaching out-of-field."

This measure provides a good indication of the extent of the out-of-field teaching problem for teachers and how it varies across subject areas. However, the measure provides no information on the number or proportion of courses taught out-of-field or on the extent to which students are exposed to out-of-field teachers, because the each subject area taught measure does not consider the number of classes taught in each subject area or the number of students in a class. Whether a teacher teaches 1 or 3 math classes or whether each class has 15 or 30 students does not matter to the calculation of the each subject area taught measure. Thus, the measure provides only modest information to researchers and policymakers interested in out-of-field teaching as an instructional quality problem for students.

Measure 3: Classes Taught In- or Out-of-Field

Two measures provide insight into the extent of the out-of-field teaching problem for students. One approach is to track the number of *classes* that are taught in-field or out-of-field within a given subject area. The SASS asked teachers to report each class they taught and the number of students in each class. For this approach, the subject of each class taught is compared to the teacher's credentials to determine whether each class is taught in-field or out-of-field. The "classes taught" measure provides an estimate of the *percent of all classes taught in a specific subject area that are taught by teachers who are out-of-field.*

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[15] See section III of this appendix for definitions of "pull-out" and other teaching contexts.

[16] The table titles and notes describe the teacher populations included in the tables. Section III of this appendix provides more detailed explanations of the reasons sub-populations of teachers cannot be reported with certain measures.

Of course, classes vary in size. Thus, while this measure provides an indication of the percent of courses taught out-of-field, it does not provide the best estimate of the proportion of students taught by teachers outside their areas of preparation. However, data concerning the number of classes teachers teach are sometimes more reliable than data concerning the number of students taught. Thus, the classes taught measure can be a valuable indication of student exposure to out-of-field teaching.

Measure 4: Students Taught In- or Out-of-Field

The second approach that measures the extent of the out-of-field instruction problem for students uses data on the number of students in each class taught. This approach tracks the number of students taught by teachers who are in-field or out-of-field in a specific subject area. The "students taught" measure provides the most targeted assessment of the extent to which students are exposed to underqualified teachers. This measure allows analysts to report the *percent of all students taught each subject by teachers who are teaching outside their areas of preparation.*

Summary of the Measures

The teacher measure based on main assignment field yields the lowest estimates of out-of-field teaching because it ignores the cases where teachers have classes that are outside their main assignment areas. The teacher measure based on all classes taught tends to produce the highest estimates of out-of-field teaching because it gives equal weight to all teachers with any classes out-of-field, regardless of the number of classes. The student-based measures of the number of classes taught and the number of students taught tend to be on a par, and usually fall in between the two teacher-based measures.

II. Matching Teacher Assignments and Teacher Credentials

Determining out-of-field status required matching the teachers' assignments with their subject areas of certification and the subject areas in which they received majors or minors in higher education. To aid respondents in listing the areas they taught and had credentials, the Schools and Staffing Survey (SASS, described in detail in sections VI–XVI of this appendix) offered teachers three lists. The first list (Major and Minor Field of Study Codes) provided teachers a list of fields of study. The second list (Teaching Assignment Field Codes) provided teachers a list of potential main assignment fields. Teachers were asked to use the same list when reporting fields in which they had earned certification. The third list (Subject Matter Codes) provided teachers a list of subjects in which they could have taught one or more classes. This third list was slightly different from the Teaching Assignment Field Codes list that teachers used to report main assignments and areas of certification (i.e., the subject matter codes do not map one to one with the teaching assignment codes).

On Measure 1 (teacher main assignments), teachers' main assignments and areas of certification were directly matched. Teachers were asked to report their main assignments and certification areas from the same list; therefore matching assignments and certification was straightforward.

Matching fields of study with main assignments was somewhat more complicated, because teachers reported fields of study and main assignments off separate lists. NCES consulted with subject area experts to decide which fields of study provided appropriate preparation for which main teaching assignments. Because the lists of fields of study and teaching assignments changed somewhat between administrations of the SASS, the matches across the different years are not exactly the same for each subject area. Table A-1 includes the matches for each of the years.

Measures 2–4 were all matched differently from Measure 1. These matches were based on the subject matter of courses teachers taught rather than on teachers' main assignments. Thus, the subject matter areas in which teachers reported teaching one or more classes were matched with their areas of certification and their fields of postsecondary study. Though the lists from which teachers reported their areas of certification and the subject matter of classes they taught were somewhat different, the two lists matched in a straightforward manner. Attempts to develop matches for vocational education were not successful. NCES consulted with subject area experts to match teachers' fields of study with the subject matter they were prepared to teach. Again, the subject matter codes lists changed slightly across the SASS administrations. Table A-1 lists these matches for all years.

Table A-1.—Matches of teacher assignments, fields of major/minor study, and areas of certification, selected years, 1987–88 to 1999–2000

Year	Nominal subject area	Main assignment	Course subject matter	Major/minor field	Certification area
1999–2000	**English**	**Any of:** English or language arts Journalism Reading	**Any of:** Literature Composition/journalism/creative writing Reading Other English/language arts course	**Any of:** English/language arts education Reading education English literature or composition Communications or journalism	**Any of:** English or language arts Journalism Reading
1993–1994	**English**	**Any of:** Journalism English/Language arts Reading	**Any of:** Literature Composition/journalism/creative writing Reading Other English/language arts courses	**Any of:** Communications and journalism English (literature, letters, speech, classics) English education Reading education	**Any of:** Journalism English/Language arts Reading
1990–1991	**English**	**Any of:** Journalism English/Language arts Reading English	**Any of:** Literature Composition/journalism/creative writing Reading Other English/language arts courses	**Any of:** Communications and journalism English (literature, letters, speech, classics) English education Reading education	**Any of:** Journalism English/Language arts Reading English
1987–1988	**English**	**Any of:** English/language arts Reading	**Any of:** Literature Composition/journalism/creative writing Reading Other English/language arts courses	**Any of:** Communications Letters (English, literature, speech, classics) English education Reading education	**Any of:** English/language arts Reading
1999–2000	**Foreign language ***	French	French	French	French
		German	German	German	German
		Latin	Latin	Latin	Latin
		Russian	Russian	Russian	Russian
		Spanish	Spanish	Spanish	Spanish
1993–1994	**Foreign language***	French	French	French	French
		German	German	German	German
		Latin	Latin	Latin	Latin
		Spanish	Spanish	Spanish	Spanish

* Indicates areas in which assignment/subject matter must match directly with major/minor and certification as shown.

Table A-1.—Matches of teacher assignments, fields of major/minor study, and areas of certification, selected years, 1987–88 to 1999–2000—Continued

Year	Nominal subject area	Main assignment	Course subject matter	Major/minor field	Certification area
1990–1991	**Foreign language***	French	French	French	French
		German	German	German	German
		Latin	Latin	Latin	Latin
		Spanish	Spanish	Spanish	Spanish
1987–1988	**Foreign language***	Not applicable	Not applicable	Not applicable	Not applicable
1999–2000	**Mathematics**	Mathematics	**Any of:** Algebra, elementary Algebra, intermediate Algebra, advanced Analytic geometry Basic and general mathematics Business and applied math Calculus Geometry Integrated math Pre-algebra Pre-calculus Statistics and probability Trigonometry Other math	**Any of:** Mathematics education Mathematics Statistics Physics Engineering	Mathematics
1993–1994	**Mathematics**	Mathematics	**Any of:** General mathematics Business math Algebra, elementary Algebra, intermediate Algebra, advanced Geometry, plane/solid Trigonometry Analytic geometry/math analysis Probability/statistics Calculus Other mathematics	**Any of:** Mathematics Mathematics education Engineering Physics	Mathematics

* Indicates areas in which assignment/subject matter must match directly with major/minor and certification as shown.

Table A-1.—Matches of teacher assignments, fields of major/minor study, and areas of certification, selected years, 1987–88 to 1999–2000—Continued

Year	Nominal subject area	Main assignment	Course subject matter	Major/minor field	Certification area
1990–1991	**Mathematics**	Mathematics	**Any of:** General mathematics Business math Algebra, elementary Algebra, intermediate Algebra, advanced Geometry, plane/solid Trigonometry Analytic geometry/math analysis Probability/statistics Calculus Other mathematics	**Any of:** Mathematics Mathematics education Engineering Physics	Mathematics
1987–1988	**Mathematics**	Mathematics	**Any of:** General mathematics Business math Algebra, elementary Algebra, intermediate Algebra, advanced Geometry, plane/solid Trigonometry Analytic geometry/math analysis Probability/statistics Calculus Other mathematics	**Any of:** Mathematics Mathematics education Engineering Physics	Mathematics
1999–2000	**Science**	**Any of:** Biology or life science Chemistry Earth/space science/geology General science Physical science Physics Other natural sciences	**Any of:** Biology or life science Chemistry Integrated science Geology/earth/space science Physics Other physical science Other natural science	**Any of:** Science education Biology/life science Chemistry Geology/earth science Physics Other natural sciences Engineering	**Any of:** Biology or life science Chemistry Earth/space science/geology General science Physical science Physics Other natural sciences
1993–1994	**Science**	**Any of:** Physical science Biology/Life science Chemistry Geology/Earth science/Space science Physics General and all other sciences	**Any of:** General science Biology/life science Chemistry Physics Geology/earth science/space science Other physical science Other natural science	**Any of:** Engineering Science education Biology/life science Chemistry Geology/earth science Physics Other natural sciences	**Any of:** Physical science Biology/Life science Chemistry Geology/Earth science/Space science Physics General and all other sciences

* Indicates areas in which assignment/subject matter must match directly with major/minor and certification as shown.

Table A-1.—Matches of teacher assignments, fields of major/minor study, and areas of certification, selected years, 1987–88 to 1999–2000—Continued

Year	Nominal subject area	Main assignment	Course subject matter	Major/minor field	Certification area
1990–1991	**Science**	**Any of:** Biology/Life science Chemistry Geology/Earth science/Space science Physics General and all other sciences	**Any of:** General science Biology/life science Chemistry Physics Geology/earth science/space science Other physical science Other natural science	**Any of:** Engineering Science education Biology/life science Chemistry Geology/earth science Physics Other natural sciences	**Any of:** Biology/Life science Chemistry Geology/Earth science/Space science Physics General and all other sciences
1987–1988	**Science**	**Any of:** Biology Chemistry Earth science/geology Physics General and all other science	**Any of:** General science Biology/life science Chemistry Physics Earth/space science Other physical science Other natural science	**Any of:** Biological/life science Engineering Chemistry Physics Geology/earth sciences Other physical sciences Science education	**Any of:** Biology Chemistry Earth science/geology Physics General and all other science
1999–2000	**Biology/ Life science**	Biology or life science	Biology or life science	Biology/life science	Biology or life science
1993–1994	**Biology/ Life science**	Biology/Life science	Biology/Life science	Biology/Life science	Biology/Life science
1990–1991	**Biology/ Life science**	Biology/Life science	Biology/Life science	Biology/Life science	Biology/Life science
1987–1988	**Biology/ Life science**	Biology	Biology/life science	Biological/Life sciences	Biology
1999–2000	**Physical science**	**Any of:** Chemistry Earth/space science/geology Physical science Physics	**Any of:** Chemistry Geology/earth science/space science Physics Other physical science	**Any of:** Chemistry Geology/earth science Physics Engineering	**Any of:** Chemistry Earth/space science/geology Physical science Physics
1993–1994	**Physical science**	**Any of:** Physical science Chemistry Geology/Earth science/Space science Physics	**Any of:** Chemistry Physics Geology/earth science/space science Other physical science	**Any of:** Chemistry Geology/earth science Physics Engineering	**Any of:** Physical science Chemistry Geology/Earth science/Space science Physics
1990–1991	**Physical science**	**Any of:** Chemistry Geology/Earth science/Space science Physics	**Any of:** Chemistry Physics Geology/earth science/space science Other physical science	**Any of:** Chemistry Geology/earth science Physics Engineering	**Any of:** Chemistry Geology/Earth science/Space science Physics
1987–1988	**Physical science**	**Any of:** Chemistry Earth science/geology Physics	**Any of:** Chemistry Physics Earth/space science Other physical science	**Any of:** Engineering Chemistry Physics Geology/earth sciences	**Any of:** Chemistry Earth science/geology Physics

* Indicates areas in which assignment/subject matter must match directly with major/minor and certification as shown.

Table A-1.—Matches of teacher assignments, fields of major/minor study, and areas of certification, selected years, 1987–88 to 1999–2000—Continued

Year	Nominal subject area	Main assignment	Course subject matter	Major/minor field	Certification area
1999–2000	**Chemistry**	Chemistry	Chemistry	Chemistry	Chemistry
1993–1994	**Chemistry**	Chemistry	Chemistry	Chemistry	Chemistry
1990–1991	**Chemistry**	Chemistry	Chemistry	Chemistry	Chemistry
1987–1988	**Chemistry**	Chemistry	Chemistry	Chemistry	Chemistry
1999–2000	**Geology/earth/ space science**	Geology/earth science/ space science	Geology/earth science/space science	Geology/earth science	Geology/earth science/space science
1993–1994	**Geology/earth/ space science**	Geology/Earth science/ Space Science	Geology/earth science/ space science	Geology/earth science	Geology/Earth science/Space Science
1990–1991	**Geology/earth/ space science**	Geology/Earth science/ Space Science	Geology/earth science/ space science	Geology/earth science	Geology/Earth science/Space Science
1987–1988	**Geology/earth/ space science**	Earth/science/geology	Earth/space science	Geology/earth science	Earth science/geology
1999–2000	**Physics**	Physics	Physics	**Any of:** Physics Engineering	Physics
1993–1994	**Physics**	Physics	Physics	**Any of:** Physics Engineering	Physics
1990–1991	**Physics**	Physics	Physics	**Any of:** Physics Engineering	Physics
1987–1988	**Physics**	Physics	Physics	**Any of:** Physics Engineering	Physics
1999–2000	**Social science**	Social studies or social science [including history]	**Any of:** Social studies Civics Economics Geography History Political science/government Psychology Sociology/social organization World civilization Other social science	**Any of:** Social studies/social science education American Indian/North American studies Public administration or service Other area or ethnic studies Economics History Political science and government, Psychology Sociology Other social sciences	Social studies or social science (including history)

* Indicates areas in which assignment/subject matter must match directly with major/minor and certification as shown.

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Table A-1.—Matches of teacher assignments, fields of major/minor study, and areas of certification, selected years, 1987–88 to 1999–2000—Continued

Year	Nominal subject area	Main assignment	Course subject matter	Major/minor field	Certification area
1993–1994	**Social science**	Social studies/Social science (including history)	**Any of:** Social studies History World civilization Political science/government Geography Economics Civics Sociology/social organization Other social science Psychology	**Any of:** Psychology Public affairs and services Social studies/social sciences education Economics History Political science and government Sociology Other social sciences American Indian studies (Native American) Other area and ethnic studies	Social studies/Social science (including history)
1990–1991	**Social science**	Social studies/Social science (including history)	**Any of:** Social studies History World civilization Political science/government Geography Economics Civics Sociology/social organization Other social science Psychology	**Any of:** Psychology Public affairs and services Social studies/social sciences education Economics History Political science and government Sociology Other social sciences American Indian studies (Native American) Other area and ethnic studies	Social studies/Social science (including history)
1987–1988	**Social science**	Social studies/social science	**Any of:** Social studies History World civilization Political science/government Geography Economics Civics Sociology/social organization Other social sciences	**Any of** Area and ethnic studies Psychology Public affairs and services Economics History Political science and government Sociology Other social sciences Social studies/social sciences education	**Any of:** Social studies/social science
1999–2000	**History**	Not applicable	**Any of:** History World civilization	History	Social studies/Social science
1993–1994	**History**	Not applicable	**Any of:** History World civilization	History	Social studies/Social science (including history)

* Indicates areas in which assignment/subject matter must match directly with major/minor and certification as shown.

Table A–1.—Matches of teacher assignments, fields of major/minor study, and areas of certification, selected years, 1987–88 to 1999–2000—Continued

Year	Nominal subject area	Main assignment	Course subject matter	Major/minor field	Certification area
1990–1991	**History**	Not applicable	**Any of:** History World civilization	History	Social studies/Social science (including history)
1987–1988	**History**	Not applicable	Not applicable	History	Not applicable
1999–2000	**Elementary education**	Any of: Kindergarten Elementary	**Any of :** Kindergarten Elementary	**Any of:** Kindergarten, or Elementary education	**Any of:** Kindergarten Elementary
1993–1994	**Elementary education**	General elementary	**Any of :** Elementary education	Elementary education	General elementary
1990–1991	**Elementary education**	General elementary	**Any of :** Elementary education	Elementary education	General elementary
1987–1988	**Elementary education**	General elementary	**Any of :** Elementary education	Elementary education	General elementary
1999–2000	**Bilingual Education/English as a Second Language**	**Any of:** Bilingual education English as a Second Language	English as a Second Language	**Any of:** Bilingual education English as a Second Language	**Any of:** Bilingual education English as a Second Language
1993–1994	**Bilingual Education/English as a Second Language**	**Any of:** Bilingual education English as a Second Language	English as a Second Language	**Any of:** Bilingual education English as a Second Language	**Any of:** Bilingual education English as a Second Language
1990–1991	**Bilingual Education/English as a Second Language**	**Any of:** Bilingual education English as a Second Language	English as a Second Language	**Any of:** Bilingual education English as a Second Language	**Any of:** Bilingual education English as a Second Language
1987–1988	**Bilingual Education/English as a Second Language**	**Any of:** Bilingual education English as a Second Language	English as a Second Language	**Any of:** Bilingual education English as a Second Language	**Any of:** Bilingual education English as a Second Language

* Indicates areas in which assignment/subject matter must match directly with major/minor and certification as shown.

Table A-1.—Matches of teacher assignments, fields of major/minor study, and areas of certification, selected years, 1987–88 to 1999–2000—Continued

Year	Nominal subject area	Main assignment	Course subject matter	Major/minor field	Certification area
1999–2000	**Arts and Music***	Art	Arts and crafts	**Any of:** Art, fine and applied Art education	Art
		Drama/theatre	Not applicable	Drama or theatre	Drama/theatre
		Not applicable	Drama/theatre/dance	Drama or theatre	**Any of:** Dance Drama/theatre
		Music	**Any of :** Chorus Band Music	**Any of:** Music Music education	Music
		Not applicable	Filmmaking and photography	**Any of:** Art, fine and applied, Art education	Not applicable
1993–1994	**Arts and Music***	Art	Arts and crafts	**Any of:** Art, fine and applied Art education	Art
		Drama/theater	Drama/theater/dance	**Any of:** Art education Drama, theater	Drama/theater
		Music	**Any of :** Chorus Band Music	**Any of:** Music Music education	Music
			Filmmaking/photography	**Any of:** Art, fine and applied Art education	
1990–1991	**Arts and Music***	Art	Arts and crafts	**Any of:** Art, fine and applied Art education	Art
		Drama/theater	Drama/theater/dance	**Any of:** Art education Drama, theater	Drama/theater
		Music	**Any of :** Chorus Band Music	**Any of:** Music Music education	Music
			Filmmaking/photography	**Any of:** Art, fine and applied Art education	

* Indicates areas in which assignment/subject matter must match directly with major/minor and certification as shown.

Table A–1.—Matches of teacher assignments, fields of major/minor study, and areas of certification, selected years, 1987–88 to 1999–2000—Continued

Year	Nominal subject area	Main assignment	Course subject matter	Major/minor field	Certification area
1987–1988	**Arts and Music***	Art	Arts and crafts	**Any of:** Fine and applied arts Art education	Art
		Music	**Any of :** Chorus Band Music	Music education	Music
			Filmmaking/photography	**Any of:** Fine and applied arts Art education	
			Drama/theater/dance	Art education	
1999–2000	**Special education**	**Any of:** Special education, general Autism Deaf and hard-of-hearing Developmentally delayed Early childhood special education Emotionally disturbed or behavior disorders Learning disabilities Mentally retarded Mildly or moderately disabled Orthopedically impaired Severely/profoundly disabled Speech/language impaired Traumatically brain-injured Visually impaired Other special education	Not Applicable	**Any of:** Special education, general Autism Deaf and hard-of-hearing Developmentally delayed Early childhood special education Emotionally disturbed or behavior disorders Learning disabilities Mentally retarded Mildly or moderately disabled Orthopedically impaired Severely or profoundly disabled Speech or language impaired Traumatically brain injured Visually impaired Other special education	**Any of:** Special education, general Autism Deaf and hard-of-hearing Developmentally delayed Early childhood special education Emotionally disturbed or behavior disorders Learning disabilities Mentally retarded Mildly or moderately disabled Orthopedically impaired Severely or profoundly disabled Speech or language impaired Traumatically brain injured Visually impaired Other special education

* Indicates areas in which assignment/subject matter must match directly with major/minor and certification as shown.

Table A-1.—Matches of teacher assignments, fields of major/minor study, and areas of certification, selected years, 1987–88 to 1999–2000—Continued

Year	Nominal subject area	Main assignment	Course subject matter	Major/minor field	Certification area
1993–1994	**Special education**	**Any of:** Special education, general Emotionally disturbed Mentally retarded Speech/language impaired Deaf and hard-of-hearing Visually handicapped Orthopedically impaired Mildly handicapped Severely handicapped Specific learning disabilities Other special education	Not Applicable	**Any of:** Special education, general Emotionally disturbed Mentally retarded Speech/language impaired Deaf and hard-of-hearing Visually handicapped Orthopedically impaired Mildly handicapped Severely handicapped Specific learning disabilities Other special education	**Any of:** Special education, general Emotionally disturbed Mentally retarded Speech/language impaired Deaf and hard-of-hearing Visually handicapped Orthopedically impaired Mildly handicapped Severely handicapped Specific learning disabilities Other special education
1990–1991	**Special education**	**Any of:** Special education, general Emotionally disturbed Mentally retarded Speech/language impaired Deaf and hard-of-hearing Visually handicapped Orthopedically impaired Mildly handicapped Severely handicapped Specific learning disabilities Other special education	Not Applicable	**Any of:** Special education, general Emotionally disturbed Mentally retarded Speech/language impaired Deaf and hard-of-hearing Visually handicapped Orthopedically impaired Mildly handicapped Severely handicapped Specific learning disabilities Other special education	**Any of:** Special education, general Emotionally disturbed Mentally retarded Speech/language impaired Deaf and hard-of-hearing Visually handicapped Orthopedically impaired Mildly handicapped Severely handicapped Specific learning disabilities Other special education
1987–1988	**Special education**	**Any of:** Mentally retarded Emotionally disturbed Learning disabled Speech and hearing impaired Other special education	Not Applicable	**Any of:** Special education, general Education of the emotionally disturbed Education of the mentally retarded Education of the speech/hearing/vision impaired Special learning disabilities Other special education	**Any of:** Mentally retarded Emotionally disturbed Learning disabled Speech and hearing impaired Other special education
1999–2000	**Physical education/health education**	**Any of:** Physical education Health education	**Any of:** Physical education Health education	**Any of:** Physical education Health education	**Any of:** Physical education Health education
1993–1994	**Physical education/health education**	**Any of :** Physical education, health education	**Any of:** Health Physical education	**Any of:** Physical education/health education	**Any of:** Physical education, health education

* Indicates areas in which assignment/subject matter must match directly with major/minor and certification as shown.

Table A-1.—Matches of teacher assignments, fields of major/minor study, and areas of certification, selected years, 1987–88 to 1999–2000—Continued

Year	Nominal subject area	Main assignment	Course subject matter	Major/minor field	Certification area
1990–1991	**Physical education/health education**	**Any of :** Physical education, health education	**Any of:** Health Physical education	**Any of:** Physical education/health education	**Any of:** Physical education, health education
1987–1988	**Physical education/health education**	**Any of :** Health, physical education	**Any of:** Health Physical education	**Any of:** Physical education/health education	**Any of:** Health, physical education
1999–2000	**Physical education**	Physical education	Physical education	Physical education	Physical education
1993–1994	**Physical education**	Not applicable	Not applicable	Not applicable	Not applicable
1990–1991	**Physical education**	Not applicable	Not applicable	Not applicable	Not applicable
1987–1988	**Physical education**	Not applicable	Not applicable	Not applicable	Not applicable
1999–2000	**Health education**	Health education	Health education	Health education	Health education
1993–1994	**Health education**	Not applicable	Not applicable	Not applicable	Not applicable
1990–1991	**Health education**	Not applicable	Not applicable	Not applicable	Not applicable
1987–1988	**Health education**	Not applicable	Not applicable	Not applicable	Not applicable

* Indicates areas in which assignment/subject matter must match directly with major/minor and certification as shown.

III. Teachers in Varying Classroom Settings

The SASS asked teachers different questions regarding their teaching assignments based on the kind of classroom setting to which they were assigned. Teachers who reported they taught subject matter courses to several classes of different students (e.g., departmentalized or elementary enrichment teachers) were asked to list each class they taught and report the number of students enrolled in each class. Teachers who reported that they taught a single group of students all or most of the day (self-contained classroom teachers) or team taught or provided instruction to students released or "pulled-out" from their regular classes (e.g., special education or reading teachers) were not asked to list all the classes they taught. They were asked to report the number of students in their one class or the average number of students in the classes they taught.

As a result, the data available differed across the teachers of varying classroom settings. The following is a set of implications for the tables:

1. The Measure 1 (main assignment) tables are unaffected, since every teacher provides information about their main teaching assignment.

2. The Measure 2 (each subject area) tables, teachers who reported they were self-contained classroom, team, or pull-out teachers were listed as having taught at least one class in their main assignment. These teachers were not asked to list classes they taught and so it is assumed they taught in their main assignment.

3. On Measures 2–4, teachers who reported they were self-contained classroom, team, or pull-out teachers and who said they were bilingual education or ESL teachers were listed as having taught at least one class of ESL because bilingual education was not listed as a subject matter code.

4. The Measure 3 (percent of classes) tables represent only teachers in departmentalized and elementary enrichment classes, since only these types of teachers provided information about each class they taught. Self-contained classroom, team and pull-out classroom teachers were not asked to describe individual classes, therefore they were not included in the analysis.

5. Because the vast majority of elementary level teachers are self-contained classroom, team, or pull-out teachers, it made little sense to report Measure 3 for the elementary level. This table is not included in the report.

6. The Measure 4 (percent of students) tables represent only students in departmentalized, elementary enrichment, and self-contained classroom settings. Team, pull-out, and self-contained classroom teachers were asked to report either the number of students in their one class or the average number of students in their multiple classes. Since team and pull-out teachers often teach multiple classes, these teachers did not report data suitable for charting the total number of students taught in-field or out-of-field.

7. The Measure 2–4 tables do not include estimates for special education teachers. Special education was not offered on the list of potential subject matter areas for classes teachers taught. Therefore, departmentalized and elementary enrichment teachers who taught special education were asked to report as a subject area the subject area in which they pro-

vided special education instruction. Therefore, it did not make sense to include estimates for special education teachers on the measures using the class subject area assignments.

IV. Teacher Grade Levels

Teachers were assigned to the elementary, middle, or secondary level based on the grades they reported teaching. Assignments were made to be consistent with the assignment of schools to elementary, middle, and secondary levels in the NCES report *In the Middle: Characteristics of Public Schools with a Focus on Middle Schools* (Alt, Choy, and Hammer 2000). Thus, in classifying schools, the elementary grades include K–4; the middle grades include 5–8; and secondary grades include 9–12.

Some teachers teach multiple grades, including grades that cross the elementary, middle, and secondary divisions. Teachers were placed into one of the three levels using information about teachers' main assignments and the range of grades they taught. Thus, teachers who taught any grades 10 or higher or who taught grade 9 only were assigned to the secondary level; these teachers were in a secondary context, even if they taught some classes at a lower level. Teachers who taught only grades K–4 and 5–8 (including grade 9 teachers also teaching some combination of grades 5–8) were assigned to elementary and middle levels, respectively. If teachers taught in both the elementary and middle grade levels, they were assigned to a level based on their main assignment. Teachers with a main assignment as an elementary education teacher or a special education teacher with assignments in any of grades K–9 (including 5–9 only) were assigned to the elementary level, because their assignment indicated a context more in keeping with the elementary level. All other teachers who taught in both elementary and middle settings were assigned to the middle level.

V. Out-of-Field Teaching in the Elementary Grades

At the elementary level, general elementary education teachers require considerable training to perform their jobs effectively. Indeed, increased public attention on early literacy skills of children has placed a premium on the quality of instruction in the earliest grades. A large and growing body of research on learning how to read has documented the complicated process of learning to read and how instructional processes influence that process (National Reading Panel 2000; Snow, Burns and Griffin, 1999). Furthermore, children develop rapidly in the early grades of school in terms of cognitive and social processes. Finally, the increasing diversity, particularly language diversity, of students entering elementary schools places additional demands on elementary level teachers (Stodolsky and Grossman 2001).[17]

The majority of public school teachers in the elementary grades reported elementary education as their main assignment field (80 percent). Over the 13-year period from 1987-88 to 1999-2000, between 25 and 30 percent of the public school elementary level teachers who reported elementary education as their main assignment did not have a postsecondary major and certification in elementary education (table B–1). The second largest group of public school elementary level teachers is those who reported special education as their main assignment field. Between 25 and 35 percent of the public school elementary teachers who reported special education as their main assignment field did not report a major and certification in special education.

Far fewer public school elementary level teachers reported main assignments in English, English as a Second Language (ESL) or bilingual education, arts and music, or physical education—fewer than 5 percent in each of these fields each year. In 1999–2000, 72 percent of the public school elementary level teachers reporting a main assignment of English did not have a major and certification in English, and 62 percent of the teachers who reported ESL/bilingual education as a main assignment field did not have a major and certification in ESL/bilingual education. About 30 percent of the elementary teachers who reported arts and music or physical education/health education as their main assignment field did not report a major and certification in the field reported.

Only 2 to 3 percent of the teachers who reported elementary education as their main assignment field did not hold a major, minor, or certification in elementary education. In 1999–2000, some 10 percent of the elementary grade teachers who reported ESL/bilingual education and 12 percent of the elementary grade teachers who reported English as their main assignment fields did not have a major, minor, or certification in those fields. In addition, between 4 and 7 percent of the elementary teachers with main assignments in special education, arts and music, and physical education/health education did not have a major, minor, or certification in the field reported.

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[17] The available data for elementary level students and their teachers only support estimates for main assignment field. These data are summarized in appendix B.

VI. Overview of the Schools and Staffing Survey (SASS)

The Schools and Staffing Survey (SASS) is an integrated set of surveys sponsored by the National Center for Education Statistics (NCES). SASS is sent to approximately 11,015 public and public charter schools nationwide, as well as to about 3,500 private schools and 124 BIA-sponsored schools, and provides information about teachers and administrators and the general condition of America's elementary, middle, and secondary schools. NCES initiated SASS in the mid-1980s in response to the need for information about critical aspects of teacher supply and demand, the qualifications and working conditions of teacher and principals, and the basic conditions in schools as workplaces and learning environments. SASS has been conducted four times: in school years 1987–88, 1990–91, 1993–94, and in 1999–2000 by the U.S. Census Bureau. For each administration of SASS, NCES has reviewed the content to expand, retain, or delete topics covered in the previous administration. In this way, the survey's capability for trend analysis is maintained, and new topics are added to address current concerns.

This report uses data from the public school teacher and public charter school teacher components. Since the teachers are sampled within the sampled schools, the technical notes will focus on the relevant school and teacher components of the survey. A more extensive description of SASS can be found in Gruber et al. (2002).

The 1999-2000 SASS Teacher Questionnaires were used to collect data from teachers regarding their education and training, teaching assignments, teaching experience, certification, teaching workload, perceptions and attitudes about teaching, job mobility, and workplace conditions. This information permits analyses of how these factors affect movement into and out of the teaching profession.

Copies of the full set of 1999–2000 SASS questionnaires may be obtained from the Schools and Staffing Survey home page on the World Wide Web at http://nces.ed.gov/surveys/sass or by writing to:

Schools and Staffing Survey Questionnaires
National Center for Education Statistics
1990 K Street, NW #9013
Washington, DC 20006-5651

VII. Target Populations and Estimates for 1999–2000 SASS

Target Populations

The 1999–2000 SASS included a nationally representative sample of public schools and a universe collection of all public charter schools with students in any of grades 1–12 and in operation in school year 1999–2000.[18] The 1999–2000 SASS administration also included nationally representative samples of teachers in the selected public and public charter schools who taught students in grades K–12 in school year 1999–2000.

Estimates

SASS was designed to support estimates both at the state and national level for the public sector. The teacher survey was designed to support comparisons between new and experienced teachers. Comparisons between teachers who teach students with limited-English proficiency and those who do not are possible at the national level. Comparisons by race or subject can also be made at the national level. State-level and state-by-school-level comparisons can be made for public school teachers.[19]

VIII. Sample Design and Implementation

Sampling Frames

1. Public Schools

The public school sampling frame was based on the 1997–98 school year Common Core of Data (CCD), a file of information collected annually by NCES from all state education agencies and believed to be the most complete public school listing available at the time of sample selection. The frame includes regular public schools and special purpose schools such as special education, vocational, and alternative schools. The frame was enhanced with a list of schools operated by the Department of Defense. After the deletion of duplicate schools, schools outside of the United States, and schools that only teach prekindergarten, kindergarten, or postsecondary students, there were a total of 88,266 schools remaining on the public school frame.

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[18] Public schools not in existence in school year 1997–98 and not opening as a result of a split with an existing school are not included. Public charter schools must have been open in school year 1998–99 and still open in school year 1999–2000 to be included.

[19] See Gruber et al. (2002) for more detail about what types of estimates are supported by the sample design.

2. Public Charter Schools

The frame for public charter schools was based on the listing of schools compiled by RPP International for the U.S. Department of Education's Office of Educational Research and Improvement (OERI) as described in *The State of Charter Schools 2000* (2000). The OERI list included public charter schools open during the 1998-99 school year; there were 1,122 schools on the public charter school frame. Public charter schools on this list were required to still be open as a public charter school during the 1999–2000 school year. One hundred twelve schools on the sampling frame failed to meet these criteria, resulting in 1,010 in-scope public charter schools.

An independent verificaion of charter school information was provided by the *National Charter School Directory 2000, Sixth Edition* (Dale 2000). Census personnel used this resource to verify the eligibility status of specific public charter schools.

Sample Selection Procedures

Schools are the primary sampling unit in SASS. Public schools were selected to be representative at the national and state levels. The entire universe of public charter schools open during the 1998–99 school year and still open in school year 1999–2000 were included in the survey. More detail is available in Cole et al. (forthcoming).

Each selected school was asked to provide a list of their teachers and teacher assignment. These lists made up the teacher sampling frame. Seven percent of public schools and 9 percent of public charter schools did not provide teacher lists. See the forthcoming report concerning the sample design and estimation procedures used in the 1999–2000 SASS (Cole et al.).

Sample Sizes

There were 51,811 in-scope public school teachers in the sample and 42,086 completed public school teacher interviews. In addition, there are 3,617 in-scope public charter school teachers with 2,847 completed interviews. The number of interviews is the number of in-scope (eligible) cases minus the eligible noninterview cases. The noninterview cases include eligible cases that refused or returned questionnaires with too little valid data to be considered complete interviews for the survey.

IX. Data Collection Procedures

Data collection for 1999–2000 SASS took place during the 1999–2000 school year. Each component began with a mail-out phase. This was followed by a second mailing, and additional nonresponse follow-up conducted by telephone from centralized telephone centers. Remaining nonrespondents were assigned to field staff, who obtained interviews by phone or personal visit. More details about data collection procedures can be found in the forthcoming *Data File User's Manual* (Tourkin et al.).

X. Response Rates

Survey Response Rates

Weighted survey response rates were computed separately for teachers in public charter schools and all other public schools. The response rates are useful as an indication of possible nonresponse bias.

The weighted response rates were derived by dividing the number of interview cases weighted by the basic weight by the total number of eligible cases weighted by the basic weights. The basic weight for each sample case is the inverse of the probability of selection.

The Teacher Questionnaire response rates are the percentage of teachers responding in schools that returned teacher lists for sampling. The weighted teacher response rates are: 83.2 percent for teachers in public schools and 78.6 percent for teachers in public charter schools. In addition, about 8 percent of public schools and 9 percent of public charter schools did not return teacher lists (these are weighted teacher list return rates). The actual ***overall weighted response rate*** is calculated by multiplying together the weighted teacher list return rate and the weighted teacher questionnaire response rate.

The overall teacher weighted response rates are:

Public teacher: .922 x .832 = .767 x 100 = 76.7% overall response rate

Public charter teacher: .913 x .786 = .718 x 100 = 71.8% overall response rate

Item Response Rates

The unweighted item response rates are the number of sample cases responding to an item divided by the number of sample cases eligible to answer the item. The item response rates for teachers' main assignment fields, postsecondary majors and minors, and fields of certification were on the order of 90.5 percent or above. When teachers were asked to provide data on each class taught, the response rates for teachers who reported 7 or fewer classes were 82.0 percent or above. However, a small percentage of the teachers (2.5 percent) reported that they taught more than 7 classes, but provided incomplete data on these classes. All legitimate missing items were imputed.

XI. Imputation Procedures

For questionnaire items that should have been answered but were not, values were imputed by (1) using data from other items on the questionnaire; (2) extracting data from a related component of the Schools and Staffing Survey (for example, using data from a school record to impute missing values on that school's library questionnaire); (3) imputing data from the Office of Educational Research and Improvement (OERI) charter school list and the *National Charter School Directory* (NCSD) for public charter schools only; (4) extracting data from the sample frame file (information about the sample case from other sources; for example, the Private School Survey or the Common Core of Data, collected in the 1997–98 school year); and (5) extracting data from a respondent with similar characteristics, using a sequential hot-deck imputation procedure. See Brick and Kalton (1996) and Kalton and Kasprzyk (1986) for a general discussion of imputation procedures. The characteristics of the donors (i.e., respondents), which determined from which case a value would be copied, vary by item/variable.

For some incomplete items, the entry from another part of the questionnaire, or the data record for a similar case was directly imputed to complete the item. For others, the entry was used as part of an adjustment factor with other data on the incomplete record. The source and method for imputation are identified in the data file by the "imputation flag" variable.

XII. Weighting

Weighting of the sample units from the public sector was carried out to produce national and state estimates for public school teachers. Public charter school teachers were weighted to produce national and regional estimates.

Each component of SASS is weighted separately. Each weighting procedure consists of several general stages of the estimation process:

- Basic Weight—is the inverse of the probability of selection of the sample unit.
- Sampling Adjustment Factor—adjusts for any alteration in the sampling unit's probability of selection. For example, a sample school may have merged with another or a sample teacher may have been selected as a result of subsampling for nonresponse follow-up.
- Noninterview Adjustment Factors—adjusts the weights of interviewed cases to account for sample cases eligible for interview but not interviewed.
- First Stage Ratio Adjustment Factor—controls the sample estimates to the sampling frame totals thereby making up for deficiencies in the sample selected.
- Teacher Adjustment Factor—applies to teacher files and controls the teacher counts from the teacher files to the teacher counts from the school files. This is done to improve the consistency in SASS estimates between files.

For more information on the weighting methodology, see the *1999–2000 SASS Sample Design and Estimation* report (Cole et al. forthcoming).

XIII. Reliability

SASS estimates provided in this report are based on samples. The sample estimates may differ somewhat from the values obtained from administering a complete census using the same questionnaire, instructions, and enumerators. The difference occurs because a sample survey estimate is subject to two types of errors: nonsampling and sampling. Estimates of the magnitude of the SASS sampling error can be derived or calculated, but not of nonsampling error. This section describes SASS nonsampling error sources, followed by a discussion of sampling error, its estimation, and its use in data analysis.[20]

Nonsampling Variability

Nonsampling errors are attributed to many sources, including, for example, an inability to obtain information about all cases in the sample,[21] definitional difficulties, differences in the interpretation of questions, an inability or unwillingness on the part of the respondents to provide correct information, an inability to recall information, poorly worded or vague questions (Salvucci et al. 1997), errors made in collection (e.g., recording or coding the data), errors made in processing the data, errors made in estimating values for missing data, and undercoverage.[22]

Quality control and edit procedures were used to reduce errors made by respondents, coders, and interviewers. More detailed discussion of the existence and control of nonsampling errors in the SASS can be found in the *Quality Profile for SASS Rounds 1–3: 1987-1995* (Kalton et al. 2000).

Sampling Variability

Standard errors indicate the magnitude of the sampling error. They also partially measure the effect of some nonsampling errors in response and enumeration, but do not measure any systematic biases in the data. The standard errors mostly measure the variations that occurred by chance because a sample was surveyed rather than the entire population.

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[20] For a discussion of all types of errors in SASS, see Jabine T. (1994). *A Quality Profile for SASS: Aspects of the Quality of Data in the Schools and Staffing Surveys* (NCES 94–340). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office. Also see Kalton et al. (2000). *Quality Profile for SASS Rounds 1–3: 1987–1995* (NCES 2000–308). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

[21] For discussion of nonresponse in the previous administrations of SASS, see Monaco, D. et al. (1998). *An Analysis of Total Nonresponse in the 1993–94 Schools and Staffing Survey* (NCES 98–243). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office. Also see Scheuren et al. (1996). *An Exploratory Analysis of Response Rates in the 1990–91 Schools and Staffing Survey (SASS)* (NCES 96–338). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

[22] Undercoverage for the public school sampling frame is described in Hammon, T. (2001). "Evaluating the Coverage of the U.S. National Center for Education Statistics Public Elementary/Secondary School Frame." *Proceedings of the Second International Conference on Establishment Surveys*. American Statistical Association, Alexandria, VA, 79–88. Also see Lee, H., Burke, J., and Rust, K. (2001). "Evaluating the Coverage of the U.S. National Center for Education Statistics Public and Private School Frame Using Data from the National Assessment of Educational Progress." *Proceedings of the Second International Conference on Establishment Surveys*. American Statistical Association, Alexandria, VA, 89–98.

The sample estimate and its standard error enable one to construct confidence intervals, ranges that would include the average result of all possible samples with a known probability. For example, if all possible samples were selected and surveyed under essentially the same conditions and with the same sample design, and if estimates and their standard errors were calculated from each sample, then

- Approximately 90 percent of the intervals from 1.645 standard errors below the estimate to 1.645 standard errors above the estimate would include the average result of all possible samples.
- Approximately 95 percent of the intervals from 1.960 standard errors below the estimate to 1.960 standard errors above the estimate would include the average result of all possible samples.

The average estimate derived from all possible samples is or is not contained in any particular computed interval. However, for a particular sample, one can say with the specified confidence that the confidence interval includes the average estimate derived from all possible samples.

Standard errors were estimated using a bootstrap variance procedure which incorporates the design features of the complex survey sample design (Kaufman 1998). Information about variance estimation software for complex sample surveys can be obtained from http://www.fas.harvard.edu/~stats/survey~soft/survey~soft.html.

XIV. Methodology and Procedures for SASS prior to 1999-2000

Inclusion/Exclusion of Charter Schools

The Schools and Staffing Survey sampling frame prior to the 1999–2000 data collection did not specifically include or exclude charter schools. For the 1987–88, 1990–91, and 1993–94 SASS, the sampling frame for public schools was from the Common Core of Data file 2 years before SASS was fielded. If any charter schools were reported to the CCD, they were not identified as such and therefore, the target population cannot be defined as including or excluding charter schools prior to 1999–2000.

Sample Sizes and Response Rates for Public Schools and Public School Teachers

Weighted response rates are defined as the number of in-scope responding questionnaires divided by the number of in-scope sample cases, using the basic weight (the inverse of the probability of selection) of the record.

Component and Year	Sample Size	Wtd. Response Rate	Overall
Public School, 1987–88	9,317	91.9%	—
Public Teacher, 1987–88	56,242	86.4%	N/A[23]
Public School, 1990–91	9,687	95.3%	—
Public Teacher, 1990–91	56,051	90.3%	85.9%
Public School, 1993–94	9,532	92.3%	—
Public Teacher, 1993–94	53,003	88.2%	83.8%

For more information about the methodology and procedures of the SASS surveys before 1999-2000, visit the SASS web site (http://nces.ed.gov/sass), see "Methods and Procedures."

Also, the technical documentation of the survey procedures and methodology are presented in each year's *Data File User's Manual, Volume I* (U.S. Department of Education 1991 for the 1987-88 data; Gruber et al. 1994 for the 1990-91 data; Gruber et al. 1996 for the 1993–94 data).

XV. Cautions Concerning Change Estimates

Care must be taken in estimating change over time in a SASS data element, because some of the measured change may not be attributable to a change in the educational system. Some of the change may be due to changes in the sampling frame, to a questionnaire item wording, or to other changes detailed in Cole et al. (forthcoming).

There were several changes that might impact the data used in this report. For example, there were revisions to the questionnaires: questions were reworded based on the results of cognitive testing and the order of questions on the questionnaires was changed. The sampling frame has changed somewhat over time. In particular, the introduction of public charter schools into the educational system has affected estimates of noncharter public schools as well as public schools overall. And finally, some definitions and concepts have changed over time.

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[23] The teacher list response rates for 1987-88 are not recorded in any of the data file documentation and are unknown.

XVI. Definitions

The following survey terms are defined as they apply to SASS.

Certification. A license or certificate awarded by the state to teach in a public school.

Charter school. (See public charter school)

Departmentalized instruction. The SASS teacher questionnaires define teachers in departmentalized instruction as teachers who teach subject matter courses (e.g., biology, history, keyboarding) to several classes of different students all or most of the day.

English/language arts. English/language arts teachers include all teachers who teach at least one class in literature, composition/journalism/creative writing, reading, or other English/language courses.

Elementary grades teachers. The elementary grades, K–4, include those teaching in these grades exclusively, and those who teach some combination of grades K–9 with a main assignment field of elementary education or special education and do not teach any grades higher than 9.

Full standard state certification in field to be taught. This term is not defined in the SASS questionnaires. A general definition is a license or certificate awarded by the state to teach a specific field or subject area in that state. The certificate is a regular or standard state certificate or advanced professional certificate; it does include provisional, temporary, or emergency certificates.

High school grades teachers. The high school grades, 9–12, include those teaching grade 9 only and those teaching any grades 10 or higher.

Limited-English Proficiency. The SASS school questionnaires define Limited-English proficient (LEP) students as students whose native or dominant language is other than English and whose difficulties in speaking, reading, writing, or understanding the English language are sufficient to deny them the opportunity to learn successfully in an English-speaking-only classroom.

Main assignment field. The field in which the teacher teaches the most classes, as indicated by the teacher.

Major or minor. A field of study in which an individual has taken substantial academic coursework, implying that the individual has substantial knowledge of the academic discipline or subject area.

Mathematics. Mathematics teachers include all teachers who teach at least one class in elementary algebra, intermediate algebra, advanced algebra, analytic geometry, basic and general mathematics, business and applied math, calculus, geometry, integrated math, pre-algebra, pre-calculus, statistics and probability, trigonometry, or other math course.

Median. The midpoint of the data, or where precisely 50 percent of the values lie above it, and 50 percent lie below it.

Middle grades teachers. The middle grades, generally 5–8, include those teaching some combination of grades K–9 and having a main assignment field other than elementary education or special education and not teaching any grades higher than 9.

Public charter school. A public charter school is a public school that, in accordance with an enabling state statute, has been granted a charter exempting it from selected state or local rules and regulations. A public charter school may be a newly created school or it may previously have been a public or private school. It includes schools open for instruction as a public charter school open during the 1998–99 school year and still open in the 1999–2000 school year.

Public school. A public school is defined as an institution that provides educational services for at least one of grades 1–12 (or comparable ungraded levels), has one or more teachers to give instruction, is located in one or more buildings, receives public funds as primary support and is operated by an education or chartering agency. Schools in juvenile detention centers and schools located on military bases and operated by the Department of Defense are included. They also include Bureau of Indian Affairs-funded schools operated by local public school districts.

Science. Science teachers include all teachers who teach at least one class in biology or life science, chemistry, integrated science, geology/earth science/space science, physics, other physical science, or other natural science course.

Self-contained classes. The SASS teacher questionnaires define teachers in self-contained classes as teachers who teach multiple subjects to the same class of students all or most of the day.

Social studies. Social studies teachers include all teachers who teach at least one class of social studies, civics, economics, geography, history, political science/government, psychology, sociology/social organization, world civilization, or other social science course.

State approved teacher preparation program. The SASS questionnaires do not provide a definition. A general definition is a program of activities and experiences, developed by a higher education institution and approved by the state, to help qualify a person to assume the responsibilities of a member of the education profession.

Teacher. A teacher is defined as a full-time or part-time teacher who teaches any regularly scheduled classes in any of grades K–12. This includes administrators, librarians, and other professional or support staff who teach regularly scheduled classes on a part-time basis. Itinerant teachers are included, as well as long-term substitutes who are filling the role of regular teacher on a long-term basis. An itinerant teacher is defined as a teacher who teaches at more than one school (for example, a music teacher who teaches three days per week at one school and two days per week at another). Short-term substitute teachers and student teachers are not included.

Technical References

Alt, N., Choy, S.P., and Hammer, C.H. (2000). *In the Middle: Characteristics of Public Schools With a Focus on Middle Schools* (NCES 2000–312). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Brick, M. and Kalton, G. (1996). "Handling Missing Data in Survey Research." *Statistical Methods in Medical Research* 5: 215–238.

Cole, C., Fondelier, S., Jackson, B., Parmer, R., Warner, T., and Weant, G. (forthcoming). *1999–2000 Schools and Staffing Survey: Sample Design and Estimation* (NCES 2002–304). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Dale, A. (Ed.). (2000). *National Charter School Directory 2000 (Sixth Edition).* Washington, DC: The Center for Education Reform.

Gruber, K., Rohr, C., and Fondelier, S. (1994). *1990–91 Schools and Staffing Survey: Data File User's Manual, Volume I: Survey Documentation* (NCES 93–144-I). Washington, D.C.: U.S. Government Printing Office.

Gruber, K., Rohr, C., and Fondelier, S. (1996). *1993–94 Schools and Staffing Survey: Data File User's Manual, Volume I: Survey Documentation* (NCES 96–142). Washington, D.C.: U.S. Government Printing Office.

Gruber, K., Wiley, S.D., Broughman, S.P., Strizek, G.A., and Burian-Fitzgerald, M. (2002). *Schools and Staffing Survey, 1999-2000: Overview of the Data for Public, Private, Public Charter, and Bureau of Indian Affairs Elementary and Secondary Schools* (NCES 2002-313). Washington, D.C.: U.S. Government Printing Office.

Hammon, T. (2001). "Evaluating the Coverage of the U.S. National Center for Education Statistics Public Elementary/Secondary School Frame." *Proceedings of the Second International Conference on Establishment Surveys.* Alexandria, VA: American Statistical Association, 79–88.

Jabine T. (1994). *A Quality Profile for SASS: Aspects of the Quality of Data in the Schools and Staffing Surveys* (NCES 94–340). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Kalton, G. and Kasprzyk, D. (1986). "The Treatment of Missing Survey Data." *Survey Methodology 12*(1): 1–16.

Kalton G., Winglee, M., Krawchuk, S., and Levine, D. (2000). *Quality Profile for SASS: Rounds 1-3: 1987-1995* (NCES 2000–308). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Kaufman, S. (1998). "A Bootstrap Variance Estimator for Systematic PPS Sampling," in *1998 Proceedings of the Section on Survey Research Methods*. Alexandria, VA: American Statistical Association, 769–774.

Lee, H., Burke, J., and Rust, K. (2001). "Evaluating the Coverage of the U.S. National Center for Education Statistics Public and Private School Frame Using Data from the National Assessment of Educational Progress." *Proceedings of the Second International Conference on Establishment Surveys*. Alexandria, VA: American Statistical Association, 89–98.

Monaco, D., Salvucci, S., Zhang, F., and Hu, M. (1998). *An Analysis of Total Nonresponse in the 1993–94 Schools and Staffing Survey* (NCES 98–243). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

National Commission on Teaching and America's Future. (1996). *What Matters Most: Teaching for America's Future. Report of the National Commission on Technology & America's Future*. Summary Report. New York: Author.

National Reading Panel (2000). *Teaching Children to Read: An Evidence-Based Assessment of the Scientific Research Literature on Reading and its Implications for Reading Instruction.* Bethesda, MD: National Institue of Child Health and Human Development.

Office of Educational Research and Improvement. (2000). *The State of Charter Schools 2000*. Washington, DC: U.S. Department of Education.

Salvucci, S., Walter, E., Conley, V., Fink, S., and Saba, S. (1997). *Measurement Error Studies at the National Center for Education Statistics* (NCES 97–464). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Scheuren, F., Monaco, D., Zhang, F., Ikosi, G., and Chang, M. (1996). *An Exploratory Analysis of Response Rates in the 1990–91 Schools and Staffing Survey (SASS)* (NCES 96–338). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Snow, C.E., Burns, M.S., and Griffin, P. (Eds.) (1999). *Preventing Reading Difficulties in Young Children*. Washington, DC: National Research Council.

Stodolsky, S.S. and Grossman, P.L. (2001). Changing Students, Changing Teaching. *Teachers College Record, 125*(1): 125-172.

Tourkin, S.C., Pugh, K.W., Parmer, R.J., and Gruber, K.J. (forthcoming). *1999–2000 Schools and Staffing Survey: Data File User's Manual.* U.S. Department of Education, National Center for Education Statististics. Washington, DC: U.S. Government Printing Office.

U.S. Department of Education (1991). *1987-88 Schools and Staffing Survey Public and Private Teacher Demand and Shortages Questionnaires, Base Year: Data File User's Manual.* (NCES 91–021g). Washington, DC: U.S. Government Printing Office.

Zukerberg, A.L. and Lee, M. (1997). *Further Cognitive Research on the Schools and Staffing Survey (SASS) Teacher Listing Form.* (NCES 97-23). Washington, DC: National Center for Education Statistics Working Paper.

Appendix B: Detailed Data Tables

Index to Detailed Data Tables

	Major/Certification	Major/Minor/Certification
Measure 1: Main Assignment		
Elementary	B–1	B–10
Middle	B–2	B–11
Secondary	B–3	B–12
Measure 2: Subject Area Taught		
Middle	B–4	B–13
Secondary	B–5	B–14
Measure 3: Classes		
Secondary	B–6	B–15
Middle	B–7	B–16
Measure 4: Students		
Secondary	B–8	B–17
Middle	B–9	B–18

Table B-1.—Percentage of public school teachers who taught elementary level grades with an undergraduate or graduate certification major and in their main assignment field, by main assignment field: 1987–88 to 1999–2000

	Major in field			No major in field			
	Total	Certified	Not certified	Total	Certified	Not certified	Total Certified
1999–2000							
English	32.7	28.5	4.2	67.3	54.5	12.8	83.0
Foreign language	#	#	#	#	#	#	#
Mathematics	10.3	#	#	89.8	66.3	23.5	#
Science	#	#	#	#	#	#	#
Social science (including history)	#	#	#	#	#	#	#
Elementary education	75.1	71.5	3.6	24.9	21.6	3.2	93.2
ESL/bilingual education	43.0	37.8	5.2	57.0	45.7	11.3	83.5
Arts and music	89.7	85.4	4.3	10.4	5.9	4.4	91.3
Special education	75.8	71.2	4.6	24.2	16.9	7.3	88.1
Physical education/health education	77.0	70.2	6.8	23.0	18.1	4.9	88.3
Health education	#	#	#	#	#	#	#
Physical education	76.4	73.1	3.3	23.6	16.7	6.9	89.8
1993–94							
English	35.8	34.4	1.4	64.2	52.0	12.2	86.4
Foreign language	#	#	#	#	#	#	#
Mathematics	3.9	3.9	#	96.1	65.6	30.5	69.5
Science	#	#	#	#	#	#	#
Social science (including history)	#	#	#	#	#	#	#
Elementary education	79.3	75.3	4.1	20.7	18.4	2.3	93.6
ESL/bilingual education	27.1	20.0	7.0	72.9	44.8	28.2	64.8
Arts and music	91.0	90.3	#	9.0	2.3	6.7	92.6
Special education	79.4	72.6	6.7	20.7	13.5	7.1	86.2
Physical education/health education	87.7	84.9	2.7	12.3	#	#	#
1990–91							
English	27.0	26.9	#	73.0	61.3	11.7	88.15
Foreign language	#	#	#	#	#	#	#
Mathematics	#	#	#	#	#	#	#
Science	#	#	#	#	#	#	#
Social science (including history)	#	#	#	#	#	#	#
Elementary education	76.5	72.4	4.1	23.5	20.9	2.6	93.3
ESL/bilingual education	23.0	17.5	5.5	77.0	51.6	25.5	69.0
Arts and music	83.6	75.0	8.5	16.4	12.3	4.2	87.3
Special education	73.5	65.5	8.0	26.5	19.4	7.1	84.9
Physical education/health education	92.0	83.2	8.8	8.0	#	#	#
1987–88							
English	29.7	27.9	1.8	70.3	65.1	5.2	93.0
Mathematics	#	#	#	#	#	#	#
Science	#	#	#	#	#	#	#
Social science (including history)	#	#	#	#	#	#	#
Elementary education	79.7	74.1	5.6	20.3	18.2	2.1	92.3
ESL/bilingual education	29.0	25.0	4.0	71.0	54.8	16.3	79.8
Arts and music	82.2	77.3	4.9	17.8	14.1	3.7	91.4
Special education	72.2	65.8	6.4	27.8	22.7	5.1	88.5
Physical education/health education	88.9	#	#	11.1	#	#	95.1

# Too few cases for a reliable estimate.

NOTE: Elementary level teachers include teachers who taught only grades K–4, as well as other teachers who taught grades 5–9 but identified themselves as elementary or special education teachers. Not all assignment areas were measured in each SASS administration. Detail may not add to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 "Public Teacher Survey," 1990–91 "Public Teacher Survey," 1993–94 "Public Teacher Survey," 1999–2000 "Public Teacher Survey," and 1999–2000 "Public Charter Teacher Survey."

Table B–2.—Percentage of public school teachers who taught middle level grades with an undergraduate or graduate major and certification in their main assignment field, by main assignment field: 1987–88 to 1999–2000

	Major in field			No major in field			
	Total	Certified	Not certified	Total	Certified	Not certified	Total Certified
				1999–2000			
English	48.0	44.5	3.5	52.0	41.4	10.6	85.9
Foreign language	53.3	39.5	13.8	46.7	42.1	4.6	81.6
Mathematics	35.3	33.2	2.1	64.7	47.1	17.6	80.3
Science	50.5	45.0	5.5	49.6	36.4	13.2	81.3
Biology/life science	46.9	43.8	3.1	53.1	45.0	8.1	88.8
Physical science	14.3	12.9	1.4	85.7	71.1	14.6	83.9
Social science (including history)	59.0	52.0	7.0	41.0	33.3	7.6	85.4
ESL/bilingual education	40.3	34.9	5.5	59.7	45.1	14.6	80.0
Arts and music	89.4	84.6	4.8	10.6	6.8	3.9	91.4
Physical education/health education	85.4	82.0	3.4	14.6	11.5	3.1	93.5
Health education	51.6	#	#	48.4	39.2	9.3	#
Physical education	85.7	82.0	3.8	14.3	11.8	2.4	93.8
				1993–94			
English	52.6	48.2	4.3	47.5	39.6	7.9	87.8
Foreign language	61.0	53.0	8.0	39.0	27.1	11.9	80.0
Mathematics	37.6	32.4	5.1	62.5	50.6	11.9	83.0
Science	49.4	43.9	5.5	50.6	40.7	9.9	84.6
Biology/life science	48.1	43.0	5.1	51.9	44.1	7.8	87.1
Physical science	7.5	#	#	92.5	80.8	11.7	#
Social science (including history)	61.7	54.3	7.4	38.3	33.2	5.1	87.6
ESL/bilingual education	30.0	25.0	5.0	70.0	41.8	28.2	66.8
Arts and music	94.1	86.7	7.4	5.9	4.3	1.6	91.0
Physical education/health education	90.3	87.0	3.3	9.7	7.8	2.0	94.7
				1990–91			
English	45.7	42.9	2.8	54.3	47.6	6.8	90.5
Foreign language	42.4	37.7	4.7	57.7	41.2	16.5	78.8
Mathematics	31.6	28.1	3.5	68.4	60.1	8.2	88.2
Science	45.1	40.6	4.5	54.9	47.8	7.0	88.4
Biology/life science	38.3	36.9	1.4	61.7	52.7	9.1	89.5
Physical science	13.6	#	#	86.4	70.5	16.0	#
Social science (including history)	58.6	55.3	3.4	41.4	36.7	4.6	92.0
ESL/bilingual education	22.1	18.1	4.0	77.9	53.4	24.6	71.4
Arts and music	93.3	86.5	6.8	6.7	5.8	0.9	92.2
Physical education/health education	90.7	84.5	6.1	9.3	7.7	1.6	92.3
				1987–88			
English	46.9	44.4	2.5	53.1	46.9	6.2	91.3
Mathematics	33.6	31.2	2.4	66.4	58.1	8.3	89.3
Science	45.6	42.0	3.6	54.4	47.3	7.1	89.3
Biology/life science	44.7	43.8	0.8	55.3	48.1	7.2	92.0
Physical science	12.3	11.1	1.2	87.7	75.0	12.7	86.1
Social science (including history)	61.4	59.0	2.4	38.6	35.2	3.4	94.2
ESL/bilingual education	26.3	22.0	4.3	73.7	54.8	18.9	76.8
Arts and music	88.7	84.1	4.6	11.3	10.8	0.5	94.9
Physical education/health education	86.4	81.5	4.9	13.6	12.3	1.3	93.9

# Too few cases for a reliable estimate.

NOTE: Middle level teachers include teachers who taught students in grades 5–9 and did not teach any students in grades 10–12; teachers who taught in grades 5–9 who identified themselves as elementary or special education teachers were classified as elementary level teachers. Not all assignment areas were measured in each SASS administration. Detail may not add to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 "Public Teacher Survey," 1990–91 "Public Teacher Survey," 1993–94 "Public Teacher Survey," 1999–2000 "Public Teacher Survey," and 1999–2000 "Public Charter Teacher Survey."

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Table B-3.—Percentage of public school teachers who taught high school grades (9–12) with an undergraduate or graduate major and certification in their main assignment field, by main assignment field: 1987–88 to 1999–2000

	Major in field			No major in field			Total
	Total	Certified	Not certified	Total	Certified	Not certified	Certified
				1999–2000			
English	81.0	75.6	5.5	19.0	17.0	2.0	92.6
Foreign language	61.3	55.8	5.5	38.7	31.4	7.3	87.2
Mathematics	79.1	73.1	6.0	20.9	16.1	4.8	89.2
Science	83.4	75.3	8.1	16.6	13.6	3.0	88.9
Biology/life science	66.0	60.1	5.9	34.0	28.8	5.2	88.9
Physical science	46.1	41.5	4.6	53.9	44.8	9.2	86.3
Chemistry	45.8	42.4	3.4	54.2	46.0	8.2	88.4
Geology/earth/space science	35.5	30.8	4.7	64.5	47.0	17.6	77.8
Physics	48.9	42.3	6.7	51.1	47.1	4.0	89.3
Social science (including history)	83.7	79.0	4.8	16.3	14.5	1.8	93.5
ESL/bilingual education	36.0	29.6	6.4	64.0	50.5	13.4	80.1
Arts and music	92.1	85.8	6.4	7.9	5.8	2.1	91.6
Physical education/health education	88.9	85.3	3.6	11.1	9.8	1.3	95.1
Health education	55.0	51.8	3.2	45.0	39.1	5.9	90.9
Physical education	87.7	84.5	3.2	12.3	11.5	0.8	96.0
				1993–94			
English	84.6	80.3	4.2	15.4	13.7	1.7	94.1
Foreign language	69.5	64.0	5.4	30.6	27.0	3.6	91.0
Mathematics	80.5	74.0	6.5	19.5	16.2	3.3	90.2
Science	84.2	76.6	7.6	15.8	13.8	2.1	90.4
Biology/life science	70.6	65.0	5.6	29.4	26.8	2.6	91.8
Physical science	34.9	32.4	2.6	65.1	57.2	7.9	89.5
Chemistry	48.1	46.5	1.6	51.9	46.0	6.0	92.5
Geology/earth/space science	34.8	31.7	3.1	65.3	58.2	7.0	89.9
Physics	48.7	42.8	5.9	51.3	47.4	3.9	90.2
Social science (including history)	83.6	78.9	4.7	16.4	14.5	1.9	93.4
ESL/bilingual education	28.0	24.8	3.2	72.0	51.2	20.7	76.0
Arts and music	94.5	87.2	7.4	5.5	4.5	1.0	91.7
Physical education/health education	92.9	88.3	4.6	7.1	5.8	1.2	94.1
				1990–91			
English	77.4	72.9	4.4	22.6	20.9	1.7	93.9
Foreign language	53.4	48.4	5.0	46.6	42.3	4.3	90.7
Mathematics	72.6	68.9	3.7	27.4	24.7	2.7	93.6
Science	79.9	75.4	4.6	20.1	18.5	1.5	93.9
Biology/life science	58.2	56.1	2.2	41.8	39.8	1.9	95.9
Physical science	35.8	34.2	1.6	64.2	59.0	5.2	93.2
Chemistry	37.2	36.4	0.8	62.8	59.0	3.8	95.5
Geology/earth/space science	31.0	#	#	69.0	59.1	9.9	#
Physics	33.1	29.8	3.2	66.9	61.7	5.2	91.5
Social science (including history)	81.4	76.8	4.6	18.6	17.4	1.2	94.2
ESL/bilingual education	25.9	22.5	3.5	74.1	51.1	23.0	73.5
Arts and music	92.1	83.2	8.9	7.9	6.6	1.3	89.8
Physical education/health education	91.6	88.7	2.9	8.4	7.6	0.8	96.4
				1987–88			
English	77.1	73.7	3.4	22.9	21.2	1.7	94.9
Mathematics	73.8	70.4	3.4	26.2	22.8	3.4	93.2
Science	80.0	75.5	4.5	20.0	17.8	2.2	93.3
Biology/life science	66.9	63.8	3.1	33.1	32.0	1.0	95.9
Physical science	42.8	40.6	2.3	57.2	51.1	6.1	91.6
Chemistry	48.8	48.0	0.8	51.2	47.0	4.2	95.0
Geology/earth/space science	30.7	27.1	3.5	69.3	57.2	12.1	84.3
Physics	36.5	32.0	4.6	63.5	58.5	4.9	90.5
Social science (including history)	76.5	73.7	2.8	23.5	22.0	1.6	95.7
ESL/bilingual education	20.7	18.3	2.4	79.3	59.2	20.1	77.5
Arts and music	88.9	84.3	4.5	11.2	10.4	0.8	94.7
Physical education/health education	87.9	84.3	3.7	12.1	11.4	0.7	95.7

# Too few cases for a reliable estimate.

NOTE: High school teachers include all teachers who taught any of grades 10–12, as well as teachers who taught grade 9 and no other grades. Not all assignment areas were measured in each SASS administration. Detail may not add to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 "Public Teacher Survey," 1990–91 "Public Teacher Survey," 1993–94 "Public Teacher Survey," 1999–2000 "Public Teacher Survey," and 1999–2000 "Public Charter Teacher Survey."

Table B-4.—Percentage of public school middle level teachers with an undergraduate or graduate major and certification in any course taught, by course subject area: 1987–88 to 1999–2000

	Major in field			No major in field			Total Certified
	Total	Certified	Not certified	Total	Certified	Not certified	
1999–2000							
English	37.7	32.2	5.5	62.3	33.3	29.0	65.4
Foreign language	43.4	34.8	8.6	56.6	31.3	25.4	66.0
Mathematics	28.1	26.1	2.0	71.9	40.3	31.6	66.4
Science	42.3	36.3	6.0	57.7	32.1	25.6	68.4
Biology/life science	35.6	27.3	8.3	64.4	27.6	36.9	54.9
Physical science	9.0	7.3	1.8	91.0	41.0	50.0	48.2
Social science	47.0	38.9	8.1	53.0	27.7	25.3	66.6
History	24.8	21.6	3.2	75.2	52.6	22.6	74.2
ESL	35.6	29.6	6.0	64.4	41.9	22.5	71.4
Arts and music	84.2	78.5	5.7	15.8	6.2	9.6	84.6
Physical education/health education	77.5	72.5	5.0	22.5	11.8	10.7	84.3
Health education	28.9	28.0	1.0	71.1	33.0	38.1	60.9
Physical education	81.5	75.6	6.0	18.5	11.7	6.8	87.2
1993–94							
English	40.4	34.3	6.1	59.6	33.5	26.1	67.7
Foreign language	58.3	51.2	7.1	41.7	20.5	21.2	71.7
Mathematics	31.9	28.5	3.4	68.1	36.3	31.8	64.8
Science	40.8	37.2	3.6	59.2	35.5	23.6	72.6
Biology/life science	38.9	30.6	8.3	61.1	30.4	30.7	61.0
Physical science	11.7	10.3	1.4	88.3	49.8	38.5	60.2
Social science	44.8	36.0	8.8	55.2	29.2	26.0	65.2
History	26.7	23.1	3.6	73.3	51.2	22.1	74.3
ESL	26.5	20.3	6.2	73.5	28.1	45.4	48.4
Arts and music	80.1	75.4	4.7	19.9	6.8	13.1	82.2
Physical education/health education	75.2	68.8	6.4	24.8	7.4	17.4	76.2
1990–91							
English	34.6	29.3	5.3	65.4	30.9	34.5	60.2
Foreign language	40.8	30.2	10.6	59.2	31.4	27.8	61.6
Mathematics	27.5	22.9	4.6	72.5	40.7	31.8	63.7
Science	39.2	34.4	4.7	60.9	35.9	25.0	70.3
Biology/life science	30.9	21.8	9.1	69.1	30.5	38.6	52.3
Physical science	10.0	4.7	5.4	90.0	25.1	64.9	29.8
Social science	47.6	38.1	9.4	52.5	23.3	29.2	61.4
History	26.0	22.5	3.4	74.0	52.4	21.7	74.9
ESL	8.4	5.8	2.7	91.6	27.2	64.4	32.9
Arts and music	83.3	75.4	7.9	16.7	6.0	10.7	81.4
Physical education/health education	74.7	63.9	10.8	25.3	6.8	18.5	70.7
1987–88							
English	34.1	28.5	5.6	65.9	30.6	35.3	59.1
Mathematics	27.7	24.1	3.7	72.3	40.7	31.6	64.8
Science	35.5	31.4	4.1	64.5	34.9	29.6	66.3
Biology/life science	32.9	23.6	9.2	67.2	18.6	48.5	42.3
Physical science	10.3	6.4	4.0	89.7	31.4	58.2	37.8
Social science	47.8	40.5	7.3	52.2	22.4	29.9	62.9
History	29.4	25.5	3.9	70.6	45.0	25.6	70.5
ESL	16.1	13.6	2.5	83.9	27.0	56.9	40.6
Arts and music	86.8	81.1	5.7	13.2	7.6	5.7	88.6
Physical education/health education	73.7	65.6	8.1	26.3	9.0	17.3	74.6

NOTE: Middle level teachers include teachers who taught students in grades 5–9 and did not teach any students in grades 10–12; teachers who taught in grades 5–9 who identified themselves as elementary or special education teachers were classified as elementary level teachers. Not all assignment areas were measured in each SASS administration. Detail may not add to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 "Public Teacher Survey," 1990–91 "Public Teacher Survey," 1993–94 "Public Teacher Survey," 1999–2000 "Public Teacher Survey," and 1999–2000 "Public Charter Teacher Survey."

Table B-5.—Percentage of public high school grades (9–12) teachers with an undergraduate or graduate major and certification in any course taught, by course subject area: 1987–88 to 1999–2000

	Major in field			No major in field			Total
	Total	Certified	Not certified	Total	Certified	Not certified	Total Certified
				1999–2000			
English	69.5	61.8	7.7	30.5	15.4	15.1	77.2
Foreign language	56.6	51.0	5.6	43.4	26.4	17.1	77.4
Mathematics	65.7	59.4	6.3	34.3	14.0	20.4	73.3
Science	73.6	65.1	8.5	26.4	13.0	13.4	78.1
Biology/life science	56.7	48.0	8.7	43.3	24.7	18.6	72.7
Physical science	35.2	30.3	4.9	64.8	38.6	26.3	68.8
Chemistry	38.0	31.0	7.0	62.0	40.8	21.2	71.8
Geology/earth/space science	19.2	15.9	3.3	80.8	28.9	51.9	44.8
Physics	30.9	23.3	7.6	69.1	35.5	33.6	58.8
Social science	72.1	63.0	9.1	27.9	12.7	15.2	75.7
History	36.3	32.5	3.7	63.7	48.0	15.8	80.5
ESL	30.3	21.8	8.5	69.7	31.7	38.1	53.4
Arts and Music	82.1	70.3	11.8	17.9	6.8	11.1	77.1
Physical education/health education	77.2	69.3	7.9	22.8	9.4	13.3	78.7
Health education	38.1	32.3	5.8	61.9	30.8	31.1	63.1
Physical education	78.8	66.5	12.4	21.2	10.0	11.2	76.5
				1993–94			
English	71.4	66.4	5.0	28.6	13.2	15.4	79.6
Foreign language	66.0	60.9	5.2	34.0	22.6	11.4	83.5
Mathematics	64.7	59.5	5.2	35.3	14.4	20.8	74.0
Science	72.9	67.4	5.5	27.1	14.8	12.4	82.1
Biology/life science	61.9	53.3	8.6	38.1	23.2	15.0	76.5
Physical science	32.1	28.2	3.9	68.0	42.6	25.4	70.8
Chemistry	35.0	32.6	2.4	65.0	43.8	21.2	76.4
Geology/earth/space science	20.0	17.3	2.7	80.0	33.6	46.4	50.9
Physics	27.2	21.4	5.9	72.8	39.8	33.0	61.1
Social science	71.5	63.4	8.1	28.5	14.7	13.8	78.1
History	41.0	37.1	3.9	59.0	45.1	13.9	82.3
ESL	22.6	19.4	3.2	77.4	39.4	38.1	58.8
Arts and Music	79.8	71.9	7.9	20.2	6.2	14.0	78.1
Physical education/health education	81.1	72.6	8.6	18.9	7.9	11.0	80.4
				1990–91			
English	65.3	57.5	7.8	34.7	16.1	18.6	73.6
Foreign language	50.9	43.5	7.5	49.1	30.7	18.3	74.2
Mathematics	58.5	53.1	5.3	41.5	17.5	24.0	70.7
Science	70.2	63.6	6.6	29.8	14.9	14.9	78.5
Biology/life science	52.9	40.6	12.3	47.1	27.2	19.9	67.8
Physical science	27.2	21.3	5.9	72.9	28.1	44.8	49.3
Chemistry	29.6	24.6	5.0	70.4	39.5	30.9	64.1
Geology/earth/space science	14.9	11.2	3.7	85.1	21.2	63.9	32.4
Physics	15.4	10.2	5.2	84.6	23.2	61.4	33.4
Social science	67.6	53.7	13.9	32.4	12.3	20.1	66.0
History	33.8	27.9	5.9	66.2	45.7	20.5	73.6
ESL	16.9	12.2	4.7	83.1	25.6	57.5	37.8
Arts and Music	77.7	67.6	10.1	22.3	5.9	16.4	73.6
Physical education/health education	77.4	63.4	14.0	22.6	5.4	17.2	68.9
				1987–88			
English	61.0	53.5	7.5	39.0	14.9	24.1	68.4
Mathematics	58.3	52.6	5.6	41.8	17.1	24.7	69.7
Science	67.4	61.5	5.9	32.6	14.3	18.4	75.7
Biology/life science	56.4	45.7	10.8	43.6	23.9	19.6	69.6
Physical science	29.2	23.2	6.0	70.8	20.7	50.1	43.9
Chemistry	36.0	29.5	6.5	64.0	27.2	36.9	56.7
Geology/earth/space science	14.7	11.0	3.7	85.3	21.5	63.8	32.5
Physics	19.7	11.1	8.7	80.3	17.7	62.6	28.7
Social science	63.8	55.8	8.0	36.2	16.1	20.1	71.9
History	35.9	33.0	3.0	64.1	43.3	20.8	76.2
ESL	12.6	9.2	3.4	87.4	23.1	64.3	32.3
Arts and Music	85.0	78.9	6.1	15.0	6.4	8.5	85.4
Physical education/health education	76.3	61.4	15.0	23.7	6.8	16.9	68.2

NOTE: High school teachers include all teachers who taught any of grades 10–12, as well as teachers who taught grade 9 and no other grades. Not all assignment areas were measured in each SASS administration. Detail may not add to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 "Public Teacher Survey," 1990–91 "Public Teacher Survey, 1993–94 "Public Teacher Survey," 1999–2000 "Public Teacher Survey," and 1999–2000 "Public Charter Teacher Survey."

Table B-6.—Percentage of public school courses taught by a middle level teacher with an undergraduate or graduate major and certification in the course subject area, by course subject area: 1987–88 to 1999–2000

	Major in field			No major in field			
	Total	Certified	Not certified	Total	Certified	Not certified	Total Certified
				1999–2000			
English	44.7	39.8	4.9	55.3	34.2	21.1	74.0
Foreign language	48.9	39.8	9.1	51.1	33.9	17.2	73.7
Mathematics	33.2	31.1	2.2	66.8	41.3	25.5	72.4
Science	48.8	42.8	6.0	51.2	32.6	18.6	75.4
Biology/life science	42.1	34.2	7.9	57.9	26.1	31.8	60.3
Physical science	8.8	7.5	1.4	91.2	49.7	41.5	57.2
Social science	56.2	47.5	8.6	43.8	26.8	17.0	74.3
History	30.7	28.7	2.0	69.3	53.2	16.2	81.9
ESL	44.5	26.0	18.5	55.5	30.4	25.1	56.4
Arts and music	88.5	83.8	4.7	11.5	5.8	5.7	89.6
Physical education/health education	86.5	82.1	4.4	13.5	9.4	4.2	91.5
Health education	39.3	38.9	0.4	60.7	38.7	22.0	77.6
Physical education	87.3	82.3	5.0	12.7	9.6	3.1	91.9
				1993–94			
English	49.7	43.9	5.8	50.3	34.9	15.4	78.8
Foreign language	64.3	56.1	8.2	35.7	19.5	16.2	75.6
Mathematics	40.0	36.0	4.0	60.1	39.5	20.5	75.5
Science	49.6	45.1	4.5	50.4	35.2	15.2	80.3
Biology/life science	43.1	34.9	8.1	57.0	35.1	21.9	70.0
Physical science	13.5	12.3	1.3	86.5	56.7	29.8	68.9
Social science	57.6	46.9	10.7	42.4	27.6	14.8	74.5
History	31.7	27.9	3.8	68.3	54.6	13.8	82.5
ESL	23.1	21.5	1.5	76.9	21.6	55.3	43.1
Arts and music	89.6	86.7	2.9	10.4	5.3	5.1	92.0
Physical education/health education	87.5	82.3	5.2	12.5	5.9	6.6	88.2
				1990–91			
English	42.9	38.5	4.4	57.1	38.4	18.7	76.9
Foreign language	46.7	39.1	7.6	53.3	37.7	15.6	76.8
Mathematics	33.9	29.5	4.4	66.1	49.1	17.1	78.5
Science	46.0	41.1	4.8	54.0	40.6	13.4	81.8
Biology/life science	34.7	28.2	6.5	65.3	38.9	26.4	67.2
Physical science	11.4	6.9	4.5	88.6	33.9	54.8	40.7
Social science	56.3	49.1	7.2	43.7	28.8	14.9	78.0
History	30.4	27.9	2.6	69.6	56.1	13.4	84.0
ESL	9.9	5.5	4.4	90.1	33.8	56.3	39.3
Arts and music	91.0	83.0	8.0	9.0	5.2	3.8	88.2
Physical education/health education	86.7	78.3	8.4	13.4	7.7	5.6	86.0
				1987–88			
English	41.0	36.8	4.2	59.0	38.3	20.8	75.0
Mathematics	33.8	29.6	4.2	66.2	49.9	16.2	79.6
Science	40.7	37.1	3.6	59.3	40.5	18.8	77.6
Biology/life science	37.0	28.9	8.1	63.0	25.7	37.3	54.6
Physical science	10.7	6.8	4.0	89.3	37.4	51.9	44.1
Social science	58.2	52.8	5.4	41.8	25.9	16.0	78.7
History	37.0	33.7	3.3	63.0	48.0	15.0	81.6
ESL	19.7	17.9	1.8	80.3	32.0	48.3	49.9
Arts and music	90.3	85.9	4.4	9.7	7.4	2.3	93.3
Physical education/health education	83.4	77.8	5.6	16.6	10.3	6.3	88.1

NOTE: Middle level teachers include teachers who taught students in grades 5–9 and did not teach any students in grades 10–12; teachers who taught in grades 5–9 who identified themselves as elementary or special education teachers were classified as elementary level teachers. Not all assignment areas were measured in each SASS administration. Detail may not add to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 "Public Teacher Survey," 1990–91 "Public Teacher Survey, 1993–94 "Public Teacher Survey," 1999–2000 "Public Teacher Survey," and 1999–2000 "Public Charter Teacher Survey."

Table B-7.—Percentage of public school courses taught by a high school grades (9–12) teacher with an undergraduate or graduate major and certification in the course subject area, by course subject area: 1987–88 to 1999–2000

	Major in field			No major in field			Total
	Total	Certified	Not certified	Total	Certified	Not certified	Certified
1999–2000							
English	75.4	67.7	7.7	24.6	15.1	9.5	82.8
Foreign language	58.9	53.0	6.0	41.1	27.0	14.0	80.0
Mathematics	73.1	66.4	6.7	26.9	13.9	13.0	80.3
Science	79.8	71.1	8.6	20.2	12.1	8.1	83.2
Biology/life science	60.8	53.1	7.6	39.2	26.7	12.5	79.8
Physical science	40.7	36.0	4.7	59.3	40.4	18.9	76.4
Chemistry	43.3	38.3	4.9	56.7	42.3	14.4	80.6
Geology/earth/space science	24.1	21.6	2.5	75.9	35.0	40.9	56.6
Physics	37.2	29.3	7.9	62.8	38.8	24.0	68.1
Social science	78.6	70.1	8.5	21.4	12.2	9.2	82.3
History	39.7	36.2	3.5	60.3	48.4	11.9	84.6
ESL	38.1	28.4	9.6	61.9	30.0	31.9	58.4
Arts and music	87.8	78.3	9.5	12.2	6.0	6.2	84.3
Physical education/health education	86.7	80.6	6.1	13.3	7.9	5.4	88.5
Health education	46.5	39.9	6.5	53.5	32.8	20.7	72.7
Physical education	85.6	76.3	9.3	14.4	9.1	5.3	85.4
1993–94							
English	80.5	76.1	4.5	19.5	12.6	6.8	88.7
Foreign language	69.1	64.0	5.1	30.9	22.3	8.6	86.3
Mathematics	73.8	68.2	5.7	26.2	14.8	11.3	83.0
Science	81.2	75.5	5.7	18.8	13.9	4.9	89.4
Biology/life science	67.9	60.6	7.3	32.1	24.9	7.2	85.5
Physical science	40.1	36.2	3.9	59.9	44.9	15.0	81.1
Chemistry	44.6	43.0	1.7	55.4	42.9	12.4	85.9
Geology/earth/space science	33.1	28.2	4.9	66.9	39.0	27.9	67.2
Physics	38.4	33.6	4.9	61.6	43.8	17.8	77.3
Social science	80.7	73.5	7.2	19.3	13.5	5.8	87.0
History	47.3	42.8	4.5	52.7	44.2	8.5	87.0
ESL	28.8	24.5	4.4	71.2	42.1	29.0	66.6
Arts and music	88.1	80.8	7.3	11.9	5.4	6.5	86.2
Physical education/health education	89.7	83.1	6.7	10.3	6.5	3.8	89.5
1990–91							
English	73.9	67.9	6.0	26.1	18.2	7.9	86.1
Foreign language	54.4	48.5	5.9	45.6	34.8	10.8	83.4
Mathematics	68.0	63.1	4.9	32.0	20.6	11.4	83.8
Science	78.2	72.4	5.8	21.8	16.0	5.8	88.4
Biology/life science	57.4	49.3	8.0	42.6	33.1	9.5	82.4
Physical science	33.3	28.2	5.1	66.7	35.0	31.7	63.2
Chemistry	38.0	35.0	3.0	62.0	46.5	15.5	81.5
Geology/earth/space science	22.7	19.9	2.9	77.3	35.6	41.7	55.4
Physics	21.1	16.9	4.2	78.9	39.2	39.7	56.1
Social science	77.8	66.2	11.6	22.2	13.4	8.9	79.6
History	38.0	32.5	5.5	62.0	48.9	13.1	81.4
ESL	16.7	13.7	3.0	83.3	32.1	51.2	45.7
Arts and music	89.2	79.7	9.6	10.8	5.5	5.3	85.1
Physical education/health education	88.0	80.2	7.8	12.0	6.1	5.9	86.4
1987–88							
English	70.2	64.6	5.6	29.8	17.1	12.7	81.7
Mathematics	68.8	64.0	4.8	31.2	20.9	10.3	84.9
Science	74.8	69.7	5.1	25.2	15.6	9.6	85.3
Biology/life science	60.9	52.8	8.2	39.1	28.8	10.3	81.6
Physical science	35.6	30.2	5.4	64.4	25.1	39.4	55.3
Chemistry	44.6	40.6	4.0	55.4	32.5	23.0	73.1
Geology/earth/space science	19.3	16.1	3.2	80.7	27.5	53.2	43.6
Physics	25.9	19.3	6.6	74.1	29.5	44.6	48.9
Social science	73.8	68.6	5.2	26.2	16.9	9.3	85.5
History	40.4	38.3	2.1	59.6	45.9	13.7	84.2
ESL	11.3	9.2	2.1	88.7	32.4	56.3	41.6
Arts and music	92.0	85.3	6.7	8.0	5.6	2.5	90.9
Physical education/health education	84.8	75.6	9.2	15.2	8.3	6.9	83.9

NOTE: High school teachers include all teachers who taught any of grades 10–12, as well as teachers who taught grade 9 and no other grades. Not all assignment areas were measured in each SASS administration. Detail may not add to totals because of rounding

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 "Public Teacher Survey," 1990–91"Public Teacher Survey," 1993–94 "Public Teacher Survey," 1999–2000 "Public Teacher Survey," and 1999–2000 "Public Charter Teacher Survey."

Table B-8.—Percentage of public school students that were taught by a middle level teacher with an undergraduate or graduate major and certification in the course subject area, by course subject area: 1987–88 to 1999–2000

	Major in field			No major in field			
	Total	Certified	Not certified	Total	Certified	Not certified	Total Certified
				1999–2000			
English	46.3	41.7	4.5	53.7	35.1	18.6	76.8
Foreign language	48.8	39.3	9.5	51.2	32.4	18.8	71.7
Mathematics	33.8	31.5	2.3	66.2	43.2	23.0	74.7
Science	49.3	42.8	6.5	50.7	33.6	17.2	76.4
Biology/life science	43.6	35.8	7.8	56.4	26.3	30.1	62.1
Physical science	7.8	6.8	1.1	92.2	50.2	42.0	57.0
Social science	57.4	48.9	8.5	42.6	27.3	15.3	76.2
History	31.3	29.0	2.3	68.7	54.0	14.7	83.0
ESL/bilingual education	37.8	27.1	10.7	62.2	26.1	36.1	53.2
Arts and music	89.4	85.0	4.5	10.6	5.7	4.9	90.7
Physical education/health education	85.9	81.1	4.8	14.1	10.2	3.9	91.3
Health education	37.4	37.0	0.4	62.6	40.7	21.9	77.7
Physical education	86.6	81.3	5.3	13.4	10.3	3.0	91.6
				1993–94			
English	48.4	41.6	6.8	51.6	33.9	17.7	75.5
Foreign language	66.1	58.7	7.4	33.9	18.8	15.1	77.5
Mathematics	39.0	34.9	4.1	61.0	38.0	23.0	72.9
Science	48.5	44.2	4.2	51.6	35.3	16.3	79.5
Biology/life science	43.4	35.6	7.8	56.6	34.2	22.4	69.8
Physical science	13.6	12.1	1.4	86.5	56.9	29.5	69.0
Social science	56.4	45.9	10.5	43.6	27.3	16.3	73.2
History	30.8	27.1	3.7	69.2	54.2	15.0	81.3
ESL/bilingual education	30.6	27.3	3.3	69.5	22.9	46.5	50.2
Arts and music	89.1	85.8	3.3	10.9	5.8	5.1	91.6
Physical education/health education	86.5	81.4	5.0	13.6	6.5	7.0	87.9
				1990–91			
English	41.2	36.7	4.5	58.8	37.1	21.7	73.9
Foreign language	45.4	37.2	8.2	54.6	36.4	18.2	73.5
Mathematics	33.3	29.2	4.1	66.7	46.9	19.8	76.1
Science	45.9	41.2	4.8	54.1	39.5	14.6	80.7
Biology/life science	34.6	27.7	7.0	65.4	39.6	25.8	67.3
Physical science	11.2	6.4	4.8	88.8	32.9	55.9	39.3
Social science	55.8	48.7	7.1	44.2	28.2	15.9	77.0
History	29.1	26.3	2.7	70.9	56.7	14.2	83.1
ESL/bilingual education	10.1	7.2	2.9	89.9	37.5	52.5	44.7
Arts and music	90.5	82.5	8.0	9.5	5.6	3.9	88.2
Physical education/health education	85.1	77.2	8.0	14.9	8.0	6.9	85.2
				1987–88			
English	40.0	35.4	4.6	60.0	36.9	23.1	72.3
Mathematics	34.0	30.1	3.9	66.1	47.0	19.1	77.0
Science	41.2	37.6	3.7	58.8	40.0	18.8	77.5
Biology/life science	37.9	30.0	7.9	62.1	24.1	38.1	54.1
Physical science	11.5	7.1	4.4	88.5	38.2	50.4	45.3
Social science	57.0	51.7	5.3	43.0	26.3	16.8	77.9
History	35.4	32.5	2.9	64.6	48.3	16.4	80.8
ESL/bilingual education	21.7	19.5	2.2	78.3	33.9	44.4	53.4
Arts and music	90.0	84.9	5.1	10.0	7.7	2.2	92.6
Physical education/health education	83.3	77.8	5.5	16.7	9.6	7.1	87.4

NOTE: Middle level teachers include teachers who taught students in grades 5–9 and did not teach any students in grades 10–12; teachers who taught in grades 5–9 who identified themselves as elementary or special education teachers were classified as elementary level teachers. Not all assignment areas were measured in each SASS administration. Detail may not add to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 "Public Teacher Survey," 1990–91"Public Teacher Survey," 1993–94 "Public Teacher Survey," 1999–2000 "Public Teacher Survey," and 1999–2000 "Public Charter Teacher Survey."

Table B-9.—Percentage of public school students that were taught by a high school grades (9–12) teacher with an undergraduate or graduate major and certification in the the course subject area, by course subject area: 1987–88 to 1999–2000

	Major in field			No major in field			Total
	Total	Certified	Not certified	Total	Certified	Not certified	Certified
1999–2000							
English	77.7	70.2	7.4	22.3	15.5	6.8	85.7
Foreign language	58.8	52.4	6.4	41.2	26.7	14.5	79.1
Mathematics	75.4	68.6	6.8	24.6	14.5	10.1	83.1
Science	81.3	72.7	8.6	18.7	12.1	6.6	84.8
Biology/life science	62.4	55.3	7.1	37.6	26.6	11.0	81.9
Physical science	41.4	36.9	4.5	58.6	40.5	18.1	77.4
Chemistry	44.1	38.9	5.2	55.9	42.8	13.1	81.7
Geology	24.0	21.4	2.6	76.0	38.0	37.9	59.4
Physics	41.6	33.5	8.1	58.4	40.2	18.2	73.7
Social science	80.6	72.1	8.5	19.4	12.4	7.0	84.5
History	41.1	37.5	3.5	58.9	49.2	9.8	86.7
ESL/bilingual education	38.2	29.2	9.0	61.8	30.6	31.1	59.8
Arts and music	89.3	80.4	8.9	10.7	5.2	5.4	85.[illegible]
Physical education/health education	87.0	80.9	6.1	13.0	8.1	4.9	89.0
Health education	47.7	42.3	5.4	52.3	32.5	19.8	74.8
Physical education	85.9	76.1	9.8	14.1	8.9	5.2	85.0
1993–94							
English	78.2	73.7	4.5	21.8	12.4	9.3	86.2
Foreign language	70.0	65.0	5.0	30.0	21.9	8.2	86.8
Mathematics	72.2	66.7	5.5	27.8	14.2	13.6	80.9
Science	79.9	74.5	5.4	20.1	13.6	6.5	88.1
Biology/life science	67.0	60.1	6.9	33.1	23.9	9.1	84.0
Physical science	39.0	35.2	3.8	61.0	45.1	16.0	80.2
Chemistry	43.6	41.9	1.7	56.4	43.1	13.3	85.0
Geology	31.1	26.5	4.7	68.9	38.3	30.6	64.8
Physics	35.0	30.3	4.7	65.0	44.7	20.3	75.0
Social science	79.0	71.4	7.6	21.0	13.6	7.4	85.0
History	45.8	41.3	4.5	54.2	44.2	10.0	85.5
ESL/bilingual education	26.9	23.5	3.4	73.1	43.6	29.5	67.1
Arts and music	86.6	79.7	6.9	13.4	5.3	8.1	85.0
Physical education/health education	89.0	82.4	6.6	11.0	6.5	4.5	88.9
1990–91							
English	71.7	65.0	6.7	28.3	17.6	10.7	82.6
Foreign language	54.4	48.2	6.2	45.6	34.1	11.5	82.3
Mathematics	66.7	61.9	4.8	33.3	19.3	13.9	81.3
Science	76.9	71.2	5.8	23.1	15.4	7.7	86.5
Biology/life science	55.8	48.2	7.6	44.2	32.9	11.4	81.0
Physical science	32.5	26.9	5.6	67.5	34.4	33.2	61.3
Chemistry	35.2	31.9	3.3	64.8	46.3	18.5	78.2
Geology	21.5	18.4	3.2	78.5	34.5	44.0	52.8
Physics	21.2	17.0	4.2	78.8	35.2	43.6	52.2
Social science	75.8	64.0	11.8	24.2	13.4	10.8	77.4
History	37.6	31.8	5.8	62.5	47.9	14.6	79.7
ESL/bilingual education	18.8	15.0	3.8	81.3	31.1	50.1	46.1
Arts and music	87.3	77.5	9.8	12.7	6.0	6.7	83.5
Physical education/health education	86.9	78.8	8.2	13.1	6.2	6.9	85.0
1987–88							
English	68.0	61.8	6.2	32.0	16.3	15.7	78.1
Mathematics	67.2	62.6	4.7	32.8	19.8	13.0	82.3
Science	74.5	69.6	4.9	25.5	15.1	10.4	84.8
Biology/life science	60.1	52.3	7.8	39.9	28.6	11.3	81.0
Physical science	35.0	29.8	5.2	65.0	25.2	39.9	55.0
Chemistry	41.6	37.1	4.5	58.4	33.8	24.6	70.9
Geology	20.1	16.9	3.2	79.9	26.9	53.0	43.7
Physics	25.5	18.4	7.1	74.5	26.3	48.2	44.7
Social science	72.0	66.3	5.7	28.0	17.4	10.7	83.6
History	40.1	37.9	2.2	59.9	45.3	14.7	83.2
ESL/bilingual education	13.4	11.3	2.2	86.6	31.3	55.3	42.6
Arts and music	90.0	84.3	5.7	10.0	6.2	3.8	90.5
Physical education/health education	84.0	75.2	8.8	16.0	8.4	7.7	83.5

NOTE: High school teachers include all teachers who taught any of grades 10–12, as well as teachers who taught grade 9 and no other grades. Not all assignment areas were measured in each SASS administration. Detail may not add to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 "Public Teacher Survey," 1990–91 "Public Teacher Survey," 1993–94 "Public Teacher Survey," 1999–2000 "Public Teacher Survey," and 1999–2000 "Public Charter Teacher Survey."

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Table B-10.—Percentage of public school teachers who taught elementary level grades with an undergraduate or graduate major or minor and certification in their main assignment field, by main assignment field: 1987–88 to 1999–2000

	Major/minor in field			No major/minor in field			
	Total	Certified	Not certified	Total	Certified	Not certified	Total Certified
1999–2000							
English	42.5	37.0	5.5	57.5	46.0	11.5	83.0
Foreign language	#	#	#	#	#	#	#
Mathematics	11.3	#	#	88.7	65.2	23.5	#
Science	#	#	#	#	#	#	#
Social science (including history)	#	#	#	#	#	#	#
Elementary education	76.4	72.6	3.8	23.6	20.5	3.1	93.1
ESL/bilingual education	47.0	40.9	6.1	53.0	42.6	10.4	83.5
Arts and music	92.0	87.6	4.4	8.0	3.6	4.4	91.3
Special education	80.0	74.9	5.1	20.0	13.2	6.8	88.1
Physical education/health education	77.0	70.2	6.8	23.0	18.1	4.9	88.3
Health education	#	#	#	#	#	#	#
Physical education	76.5	73.2	3.3	23.5	16.6	6.9	89.8
1993–94							
English	48.4	44.7	3.7	51.6	41.7	9.9	86.4
Foreign language	#	#	#	#	#	#	#
Mathematics	11.1	#	#	88.9	64.5	24.4	#
Science	#	#	#	#	#	#	#
Social science (including history)	#	#	#	#	#	#	#
Elementary education	81.1	76.9	4.2	18.9	16.7	2.1	93.6
ESL/bilingual education	33.6	25.3	8.3	66.4	39.5	26.9	64.8
Arts and music	92.0	#	#	8.1	1.4	6.7	#
Special education	82.5	75.0	7.5	17.5	11.2	6.3	86.2
Physical education/health education	87.9	85.1	2.7	12.2	#	#	#
1990–91							
English	38.7	35.5	3.2	61.4	52.7	8.7	88.2
Foreign language	#	#	#	#	#	#	#
Mathematics	#	#	#	#	#	#	#
Science	#	#	#	#	#	#	#
Social science (including history)	#	#	#	#	#	#	#
Elementary education	81.5	76.9	4.6	18.5	16.4	2.1	93.3
ESL/bilingual education	34.5	26.4	8.1	65.5	42.6	22.9	69.0
Arts and music	86.4	76.1	10.4	13.6	11.3	2.3	87.3
Special education	83.6	73.8	9.8	16.4	11.2	5.3	84.9
Physical education/health education	95.7	86.6	9.1	4.3	#	#	#
1987–88							
English	45.9	44.0	1.8	54.1	49.0	5.2	93.0
Mathematics	#	#	#	#	#	#	#
Science	#	#	#	#	#	#	#
Social science (including history)	#	#	#	#	#	#	#
Elementary education	83.9	77.9	6.0	16.1	14.4	1.7	92.3
ESL/bilingual education	41.4	36.4	5.0	58.6	43.3	15.3	79.8
Arts and music	87.7	82.2	5.5	12.3	9.2	3.2	91.4
Special education	85.8	78.3	7.5	14.2	10.2	4.0	88.5
Physical education/health education	89.5	#	#	10.6	#	#	#

# Too few sample cases for a reliable estimate.

NOTE: Elementary level teachers include teachers who taught only grades K–4, as well as other teachers who taught grades 5–9 but identified themselves as elementary or special education teachers. Not all assignment areas were measured in each SASS administration. Detail may not add to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 "Public Teacher Survey," 1990–91"Public Teacher Survey, 1993–94 "Public Teacher Survey," 1999–2000 "Public Teacher Survey," and 1999–2000 "Public Charter Teacher Survey."

Table B–11.—Percentage of public school teachers who taught middle level grades with an undergraduate or graduate major or minor and certification in their main assignment field, by main assignment field: 1987–88 to 1999–2000

	Major/minor in field			No major/minor in field			Total Certified
	Total	Certified	Not certified	Total	Certified	Not certified	
				1999–2000			
English	55.2	51.0	4.3	44.8	35.0	9.8	85.9
Foreign language	72.6	58.3	14.4	27.4	23.3	4.1	81.6
Mathematics	48.6	45.4	3.2	51.5	34.9	16.6	80.3
Science	60.0	53.2	6.8	40.0	28.1	11.9	81.3
Biology/life science	52.9	49.2	3.7	47.1	39.7	7.4	88.8
Physical science	24.9	23.3	1.7	75.1	60.7	14.4	83.9
Social science (including history)	70.4	61.7	8.7	29.6	23.6	5.9	85.4
ESL/bilingual education	42.4	36.4	6.0	57.6	43.5	14.1	80.0
Arts and music	93.2	86.9	6.3	6.8	4.5	2.4	91.4
Physical education/health education	87.4	83.8	3.6	12.6	9.7	3.0	93.5
Health education	60.2	60.2	#	39.8	30.5	9.3	90.8
Physical education	87.9	84.0	3.9	12.1	9.8	2.3	93.8
				1993–94			
English	62.6	57.0	5.6	37.5	30.9	6.6	87.8
Foreign language	70.3	60.8	9.5	29.7	19.3	10.4	80.0
Mathematics	49.7	43.7	5.9	50.3	39.3	11.0	83.0
Science	60.8	53.8	7.0	39.2	30.8	8.4	84.6
Biology/life science	53.8	48.0	5.8	46.2	39.1	7.1	87.1
Physical science	12.8	12.4	0.4	87.2	75.9	11.3	88.2
Social science (including history)	73.3	65.6	7.8	26.7	22.0	4.7	87.6
ESL/bilingual education	34.0	28.1	5.9	66.0	38.7	27.3	66.8
Arts and music	95.9	88.1	7.8	4.1	2.9	1.2	91.0
Physical education/health education	92.4	89.0	3.4	7.6	5.7	1.9	94.7
				1990–91			
English	59.5	55.8	3.7	40.5	34.7	5.8	90.5
Foreign language	66.3	51.8	14.4	33.7	27.0	6.7	78.8
Mathematics	46.9	42.8	4.1	53.1	45.4	7.7	88.3
Science	60.4	54.7	5.7	39.7	33.8	5.9	88.4
Biology/life science	46.1	44.3	1.8	53.9	45.3	8.6	89.5
Physical science	16.3	13.5	2.8	83.7	68.2	15.5	81.7
Social science (including history)	75.2	70.8	4.4	24.8	21.2	3.6	92.0
ESL/bilingual education	33.2	28.4	4.8	66.8	43.0	23.8	71.4
Arts and music	96.7	89.7	7.0	3.3	2.6	0.7	92.2
Physical education/health education	93.9	87.5	6.4	6.1	4.7	1.4	92.2
				1987–88			
English	60.8	56.6	4.2	39.2	34.7	4.5	91.3
Mathematics	51.2	47.8	3.4	48.8	41.5	7.3	89.3
Science	62.5	57.6	4.9	37.5	31.7	5.8	89.3
Biology/life science	58.3	56.1	2.2	41.7	35.9	5.9	92.0
Physical science	17.8	15.5	2.3	82.2	70.6	11.6	86.1
Social science (including history)	77.4	73.7	3.7	22.7	20.6	2.1	94.2
ESL/bilingual education	37.0	30.5	6.4	63.1	46.3	16.7	76.8
Arts and music	93.1	88.4	4.7	6.9	6.5	0.4	94.9
Physical education/health education	91.4	86.2	5.2	8.6	7.7	0.9	93.9

NOTE: Middle level teachers include teachers who taught students in grades 5–9 and did not teach any students in grades 10–12, teachers who taught in grades 5–9 who identified themselves as elementary or special education teachers were classified as elementary level teachers. Not all assignment areas were measured in each SASS administration. See appendix for technical notes and definitions of terms. Detail may not add to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 "Public Teacher Survey," 1990–91"Public Teacher Survey, 1993–94 "Public Teacher Survey," 1999–2000 "Public Teacher Survey," and 1999–2000 "Public Charter Teacher Survey."

Table B–12.—Percentage of public school teachers who taught high school grades (9–12) with an undergraduate or graduate major or minor and certification in their main assignment field, by main assignment field: 1987–88 to 1999–2000

	Major/minor in field			No major/minor in field			Total
	Total	Certified	Not certified	Total	Certified	Not certified	Certified
1999–2000							
English	86.7	80.9	5.8	13.3	11.7	1.6	92.6
Foreign language	71.7	63.6	8.1	28.3	23.7	4.6	87.3
Mathematics	85.5	78.5	7.0	14.5	10.6	3.9	89.2
Science	88.8	79.9	8.9	11.2	8.9	2.3	88.9
Biology/life science	72.3	66.0	6.4	27.7	22.9	4.7	88.9
Physical science	59.6	53.0	6.7	40.4	33.3	7.1	86.3
Chemistry	62.3	56.2	6.1	37.7	32.3	5.5	88.4
Geology/earth/space science	39.4	34.7	4.7	60.6	43.1	17.6	77.8
Physics	58.1	50.9	7.2	41.9	38.4	3.4	89.3
Social science (including history)	89.5	84.1	5.4	10.5	9.4	1.2	93.5
ESL/bilingual education	40.6	34.2	6.4	59.4	45.9	13.4	80.1
Arts and music	93.9	87.3	6.6	6.1	4.3	1.9	91.6
Physical education/health education	90.5	86.8	3.7	9.5	8.3	1.2	95.1
Health education	64.4	60.3	4.1	35.6	30.6	5.1	90.9
Physical education	89.5	86.2	3.2	10.5	9.8	0.8	96.0
1993–94							
English	90.5	85.8	4.7	9.5	8.3	1.2	94.1
Foreign language	79.1	72.4	6.7	20.9	18.6	2.3	91.0
Mathematics	88.4	80.9	7.5	11.6	9.2	2.4	90.2
Science	92.4	84.2	8.3	7.6	6.2	1.3	90.4
Biology/life science	78.3	72.1	6.2	21.7	19.6	2.1	91.8
Physical science	44.5	41.2	3.4	55.5	48.3	7.1	89.5
Chemistry	64.3	61.3	3.0	35.7	31.1	4.5	92.5
Geology/earth/space science	40.1	37.0	3.1	59.9	52.9	7.0	89.9
Physics	60.6	53.7	6.9	39.4	36.5	2.9	90.2
Social science (including history)	92.4	87.0	5.4	7.6	6.4	1.2	93.4
ESL/bilingual education	30.4	26.3	4.1	69.6	49.7	19.9	76.0
Arts and music	95.5	88.0	7.4	4.5	3.6	0.9	91.7
Physical education/health education	94.7	89.9	4.8	5.3	4.3	1.0	94.2
1990–91							
English	90.1	85.0	5.1	9.9	8.8	1.0	93.9
Foreign language	68.6	61.8	6.9	31.4	28.9	2.5	90.7
Mathematics	86.3	81.5	4.8	13.7	12.1	1.6	93.6
Science	92.8	87.2	5.5	7.2	6.7	0.6	93.9
Biology/life science	74.7	71.2	3.5	25.3	24.7	0.6	95.9
Physical science	57.4	54.7	2.7	42.6	38.6	4.0	93.2
Chemistry	63.0	60.4	2.6	37.0	35.1	1.9	95.5
Geology/earth/space science	44.6	42.9	#	55.4	45.5	9.9	88.4
Physics	49.8	46.2	3.7	50.2	45.4	4.8	91.5
Social science (including history)	94.0	88.6	5.4	6.0	5.6	0.4	94.2
ESL/bilingual education	31.8	26.1	5.7	68.3	47.5	20.8	73.5
Arts and music	95.8	86.3	9.5	4.2	3.4	0.7	89.8
Physical education/health education	95.1	92.0	3.1	4.9	4.3	0.6	96.4
1987–88							
English	89.9	85.9	4.1	10.1	9.1	1.0	94.9
Mathematics	89.2	84.8	4.4	10.8	8.4	2.4	93.2
Science	92.8	87.3	5.6	7.2	6.1	1.1	93.3
Biology/life science	79.4	75.9	3.5	20.6	19.9	0.7	95.9
Physical science	58.6	55.6	3.0	41.4	36.0	5.4	91.6
Chemistry	66.2	64.5	1.7	33.8	30.6	3.2	95.0
Geology/earth/space science	41.2	37.7	3.5	58.8	46.7	12.1	84.3
Physics	53.1	47.5	5.6	46.9	43.0	3.9	90.5
Social science (including history)	91.9	88.5	3.5	8.1	7.2	0.9	95.7
ESL/bilingual education	30.6	27.2	3.5	69.4	50.4	19.0	77.5
Arts and music	92.9	88.0	4.9	7.1	6.7	0.4	94.7
Physical education/health education	92.2	88.3	3.9	7.8	7.3	0.4	95.7

# Too few cases for a reliable estimate.

NOTE: High school teachers include all teachers who taught any of grades 10–12, as well as teachers who taught grade 9 and no other grades. Not all assignment areas were measured in each SASS administration. Detail may not add to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 "Public Teacher Survey," 1990–91"Public Teacher Survey," 1993–94 "Public Teacher Survey," 1999–2000 "Public Teacher Survey," and 1999–2000 "Public Charter Teacher Survey."

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Table B-13.—Percentage of public school middle level teachers with an undergraduate or graduate major or minor and certification in any course taught, by course subject area: 1987–88 to 1999–2000

	Major/minor in field			No major/minor in field			
	Total	Certified	Not certified	Total	Certified	Not certified	Total Certified
1999–2000							
English	45.1	37.7	7.4	54.9	27.7	27.2	65.4
Foreign language	62.2	48.1	14.0	37.9	17.9	20.0	66.0
Mathematics	39.2	35.6	3.6	60.8	30.7	30.0	66.4
Science	52.1	43.0	9.0	47.9	25.4	22.6	68.4
Biology/life science	41.5	31.5	10.1	58.5	23.4	35.1	54.9
Physical science	17.7	14.0	3.8	82.3	34.3	48.0	48.2
Social science	57.8	47.1	10.7	42.2	19.6	22.6	66.6
History	34.2	28.3	5.9	65.8	45.9	19.9	74.2
ESL	37.9	31.8	6.0	62.1	39.6	22.5	71.5
Arts and music	88.5	81.0	7.5	11.5	3.6	7.9	84.6
Physical education/health education	80.8	74.8	6.0	19.2	9.5	9.7	84.3
Health education	37.7	33.8	3.9	62.3	27.1	35.2	60.9
Physical education	84.5	78.0	6.5	15.5	9.2	6.3	87.2
1993–94							
English	49.6	41.2	8.4	50.4	26.5	23.8	67.7
Foreign language	67.1	58.1	9.1	32.9	13.6	19.3	71.7
Mathematics	41.6	36.8	4.8	58.4	28.0	30.4	64.8
Science	51.3	46.1	5.2	48.7	26.5	22.2	72.6
Biology/life science	46.2	34.8	11.4	53.8	26.2	27.6	61.0
Physical science	22.5	18.9	3.6	77.5	41.3	36.2	60.2
Social science	61.3	46.9	14.4	38.7	18.3	20.4	65.2
History	36.8	32.3	4.5	63.2	42.0	21.2	74.3
ESL	30.9	23.3	7.6	69.1	25.1	44.1	48.4
Arts and music	82.2	77.3	4.9	17.8	4.9	12.9	82.2
Physical education/health education	77.8	70.2	7.6	22.2	6.0	16.2	76.2
1990–91							
English	47.7	38.9	8.8	52.3	21.2	31.0	60.2
Foreign language	56.7	40.6	16.2	43.3	21.1	22.2	61.6
Mathematics	41.2	34.9	6.3	58.8	28.7	30.1	63.7
Science	53.1	45.8	7.3	46.9	24.5	22.4	70.3
Biology/life science	39.1	26.5	12.7	60.9	25.8	35.1	52.3
Physical science	21.2	8.6	12.6	78.8	21.2	57.6	29.8
Social science	62.1	48.2	13.9	37.9	13.2	24.7	61.4
History	36.6	31.3	5.3	63.4	43.6	19.8	74.9
ESL	12.6	8.6	4.1	87.4	24.4	63.0	32.9
Arts and music	87.7	78.3	9.4	12.3	3.1	9.2	81.4
Physical education/health education	79.7	66.4	13.3	20.3	4.2	16.1	70.7
1987–88							
English	47.9	37.6	10.3	52.1	21.5	30.6	59.1
Mathematics	42.4	36.0	6.4	57.6	28.7	28.8	64.8
Science	50.8	42.9	7.9	49.2	23.4	25.8	66.3
Biology/life science	44.2	29.4	14.7	55.8	12.8	43.0	42.3
Physical science	23.2	11.8	11.5	76.8	26.1	50.7	37.8
Social science	64.3	50.3	14.0	35.7	12.5	23.2	62.9
History	38.8	33.0	5.8	61.2	37.5	23.8	70.5
ESL	25.2	18.0	7.2	74.8	22.5	52.3	40.6
Arts and music	91.7	85.4	6.2	8.3	3.1	5.2	88.6
Physical education/health education	79.2	68.5	10.7	20.8	6.1	14.7	74.6

NOTE: Middle level teachers include teachers who taught students in grades 5–9 and did not teach any students in grades 10–12; teachers who taught in grades 5–9 who identified themselves as elementary or special education teachers were classified as elementary level teachers. Not all assignment areas were measured in each SASS administration. Detail may not add to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 "Public Teacher Survey," 1990–91"Public Teacher Survey," 1993–94 "Public Teacher Survey," 1999–2000 "Public Teacher Survey," and 1999–2000 "Public Charter Teacher Survey."

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Table B-14.—Percentage of public high school grades (9–12) teachers with an undergraduate or graduate major or minor and certification in any course taught, by course subject area: 1987–88 to 1999–2000

	Major/minor in field			No major/minor in field			
	Total	Certified	Not certified	Total	Certified	Not certified	Total Certified
1999–2000							
English	76.3	67.1	9.2	23.7	10.1	13.7	77.2
Foreign language	66.2	57.5	8.7	33.8	19.9	13.9	77.4
Mathematics	72.0	64.2	7.8	28.0	9.1	18.9	73.3
Science	79.9	69.7	10.2	20.1	8.4	11.7	78.1
Biology/life science	63.2	52.7	10.4	36.8	20.0	16.9	72.7
Physical science	48.7	40.3	8.3	51.3	28.5	22.8	68.8
Chemistry	55.6	43.3	12.3	44.4	28.5	15.9	71.8
Geology/earth/space science	22.8	17.6	5.2	77.2	27.2	50.0	44.8
Physics	39.2	28.7	10.5	60.8	30.1	30.8	58.8
Social science	79.7	68.0	11.7	20.3	7.7	12.6	75.7
History	42.4	37.1	5.3	57.6	43.4	14.2	80.5
ESL	34.5	26.0	8.5	65.5	27.5	38.1	53.4
Arts and Music	84.4	72.1	12.3	15.6	4.9	10.7	77.1
Physical education/health education	80.2	71.2	9.0	19.8	7.6	12.3	78.7
Health education	50.3	42.3	8.0	49.7	20.8	28.9	63.1
Physical education	81.9	68.6	13.3	18.1	7.9	10.2	76.5
1993–94							
English	78.6	72.0	6.7	21.4	7.6	13.8	79.6
Foreign language	75.8	69.1	6.7	24.2	14.4	9.8	83.5
Mathematics	72.3	65.9	6.4	27.7	8.0	19.7	74.0
Science	83.0	75.6	7.4	17.0	6.5	10.5	82.1
Biology/life science	70.0	59.8	10.1	30.0	16.7	13.4	76.5
Physical science	47.9	40.1	7.8	52.1	30.7	21.4	70.8
Chemistry	53.2	46.3	6.9	46.8	30.1	16.7	76.4
Geology/earth/space science	25.4	21.9	3.5	74.6	29.0	45.6	50.9
Physics	37.4	28.1	9.3	62.6	33.0	29.6	61.1
Social science	82.5	72.0	10.6	17.5	6.1	11.4	78.1
History	48.5	43.4	5.1	51.5	38.9	12.6	82.3
ESL	24.2	20.2	4.0	75.8	38.5	37.3	58.8
Arts and Music	81.8	73.4	8.4	18.2	4.7	13.5	78.1
Physical education/health education	84.4	75.1	9.3	15.6	5.3	10.3	80.4
1990–91							
English	78.8	67.1	11.7	21.2	6.5	14.7	73.6
Foreign language	66.3	53.5	12.8	33.7	20.8	12.9	74.2
Mathematics	71.7	62.8	8.8	28.3	7.8	20.5	70.7
Science	84.5	73.4	11.1	15.5	5.1	10.4	78.5
Biology/life science	67.2	49.6	17.6	32.8	18.2	14.6	67.8
Physical science	47.0	32.9	14.1	53.0	16.5	36.6	49.3
Chemistry	53.2	40.5	12.7	46.8	23.6	23.2	64.1
Geology/earth/space science	21.1	16.4	4.7	78.9	16.0	62.9	32.4
Physics	29.6	16.6	13.0	70.4	16.8	53.6	33.4
Social science	83.4	62.1	21.2	16.7	3.8	12.8	66.0
History	45.8	36.3	9.5	54.2	37.3	16.9	73.6
ESL	21.3	13.9	7.4	78.7	23.8	54.8	37.8
Arts and Music	85.5	70.7	14.8	14.5	2.9	11.6	73.6
Physical education/health education	84.3	65.8	18.5	15.7	3.1	12.7	68.9
1987–88							
English	74.1	62.1	12.0	25.9	6.3	19.6	68.4
Mathematics	72.0	63.5	8.4	28.0	6.2	21.8	69.7
Science	81.9	71.1	10.8	18.1	4.6	13.6	75.7
Biology/life science	69.2	54.8	14.4	30.8	14.8	16.0	69.6
Physical science	48.2	30.3	17.9	51.8	13.6	38.2	44.0
Chemistry	56.0	38.6	17.5	44.0	18.1	25.9	56.7
Geology/earth/space science	21.2	14.5	6.7	78.8	17.9	60.9	32.5
Physics	36.7	16.8	19.8	63.4	11.9	51.5	28.7
Social science	80.8	66.8	14.0	19.2	5.1	14.1	71.9
History	49.5	44.3	5.3	50.5	32.0	18.5	76.2
ESL	18.1	13.7	4.4	81.9	18.6	63.3	32.3
Arts and Music	89.1	82.0	7.1	10.9	3.4	7.5	85.4
Physical education/health education	83.1	64.0	19.1	16.9	4.2	12.7	68.2

NOTE: High school teachers include all teachers who taught any of grades 10–12, as well as teachers who taught grade 9 and no other grades. Not all assignment areas were measured in each SASS administration. Detail may not add to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 "Public Teacher Survey," 1990–91 "Public Teacher Survey," 1993–94 "Public Teacher Survey," 1999–2000 "Public Teacher Survey," and 1999–2000 "Public Charter Teacher Survey."

Table B–15.—Percentage of public school courses taught by a middle level teacher with an undergraduate or graduate major or minor and certification in the course subject area, by course subject area: 1987–88 to 1999–2000

	Major/minor in field			No major/minor in field			Total
	Total	Certified	Not certified	Total	Certified	Not certified	Certified
1999–2000							
English	52.5	46.1	6.5	47.5	27.9	19.5	74.0
Foreign language	68.0	54.6	13.4	32.0	19.1	12.9	73.7
Mathematics	45.5	42.2	3.3	54.5	30.2	24.4	72.4
Science	59.1	49.9	9.2	40.9	25.4	15.5	75.3
Biology/life science	46.3	37.1	9.2	53.7	23.2	30.5	60.3
Physical science	16.3	13.3	3.0	83.7	43.8	39.9	57.1
Social science	67.5	56.8	10.7	32.5	17.5	15.0	74.3
History	42.4	37.1	5.3	57.6	44.8	12.8	81.9
ESL	46.4	27.9	18.5	53.6	28.5	25.1	56.4
Arts and music	94.1	87.1	7.1	5.9	2.5	3.3	89.6
Physical education/health education	88.4	83.6	4.8	11.6	7.9	3.7	91.5
Health education	52.7	51.3	1.4	47.3	26.3	21.0	77.6
Physical education	89.1	83.8	5.2	10.9	8.0	2.9	91.8
1993–94							
English	59.7	51.9	7.8	40.3	26.9	13.5	78.8
Foreign language	72.5	62.6	9.9	27.5	13.0	14.5	75.6
Mathematics	52.1	46.4	5.7	47.9	29.2	18.8	75.5
Science	61.4	55.4	6.0	38.6	24.9	13.7	80.3
Biology/life science	51.8	39.3	12.5	48.2	30.7	17.5	70.0
Physical science	25.2	22.5	2.7	74.8	46.4	28.4	68.9
Social science	71.4	58.0	13.4	28.7	16.6	12.1	74.5
History	40.7	36.3	4.4	59.3	46.1	13.1	82.5
ESL	26.6	23.3	3.4	73.4	19.9	53.5	43.1
Arts and music	91.0	87.9	3.1	9.0	4.1	4.9	92.0
Physical education/health education	89.3	83.7	5.6	10.7	4.6	6.2	88.2
1990–91							
English	57.9	50.9	7.0	42.1	26.0	16.1	76.9
Foreign language	61.7	51.9	9.8	38.3	24.9	13.4	76.8
Mathematics	49.5	44.1	5.5	50.5	34.5	16.0	78.5
Science	61.5	54.8	6.6	38.5	26.9	11.6	81.8
Biology/life science	43.8	33.4	10.3	56.3	33.7	22.6	67.2
Physical science	23.7	11.9	11.8	76.3	28.8	47.5	40.7
Social science	70.9	61.0	9.9	29.1	17.0	12.2	78.0
History	40.5	36.1	4.4	59.5	47.9	11.6	84.0
ESL	14.7	9.4	5.3	85.3	29.9	55.4	39.3
Arts and music	94.2	85.6	8.7	5.8	2.6	3.2	88.2
Physical education/health education	90.6	81.0	9.7	9.4	5.0	4.4	86.0
1987–88							
English	55.9	48.0	7.9	44.1	27.1	17.1	75.0
Mathematics	51.8	45.6	6.3	48.2	34.0	14.2	79.6
Science	58.0	51.3	6.6	42.0	26.3	15.8	77.6
Biology/life science	51.3	37.7	13.5	48.8	16.8	31.9	54.6
Physical science	25.0	13.2	11.8	75.0	30.9	44.1	44.1
Social science	74.5	64.7	9.8	25.5	14.0	11.5	78.7
History	45.8	41.4	4.5	54.2	40.3	13.9	81.6
ESL	29.6	25.2	4.4	70.4	24.6	45.7	49.9
Arts and music	95.5	90.7	4.8	4.5	2.6	1.9	93.3
Physical education/health education	87.8	81.0	6.8	12.2	7.1	5.1	88.1

NOTE: Middle level teachers include teachers who taught students in grades 5–9 and did not teach any students in grades 10–12; teachers who taught in grades 5–9 who identified themselves as elementary or special education teachers were classified as elementary level teachers. Not all assignment areas were measured in each SASS administration. Detail may not add to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 "Public Teacher Survey," 1990–91"Public Teacher Survey," 1993–94 "Public Teacher Survey," 1999–2000 "Public Teacher Survey," and 1999–2000 "Public Charter Teacher Survey."

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Table B-16.—Percentage of public school courses taught by a high school grades (9–12) teacher with an undergraduate or graduate major or minor and certification in the course subject area, by course subject area: 1987–88 to 1999–2000

	Major/minor in field			No major/minor in field			Total
	Total	Certified	Not certified	Total	Certified	Not certified	Certified
1999–2000							
English	82.1	73.0	9.1	17.9	9.8	8.1	82.8
Foreign language	69.0	59.7	9.2	31.0	20.3	10.8	80.0
Mathematics	79.5	71.3	8.2	20.5	8.9	11.6	80.2
Science	85.0	75.4	9.7	15.0	7.9	7.1	83.3
Biology/life science	67.0	58.3	8.7	33.0	21.5	11.5	79.8
Physical science	54.0	46.7	7.2	46.0	29.7	16.4	76.4
Chemistry	61.2	52.6	8.5	38.8	28.0	10.8	80.6
Geology/earth/space science	28.8	24.4	4.4	71.2	32.2	38.9	56.6
Physics	45.8	36.2	9.7	54.2	31.9	22.2	68.1
Social science	84.6	74.4	10.1	15.4	7.8	7.6	82.2
History	46.0	41.0	5.0	54.0	43.6	10.4	84.6
ESL	42.0	32.3	9.6	58.0	26.1	31.9	58.4
Arts and music	90.4	80.4	10.1	9.6	3.9	5.7	84.3
Physical education/health education	88.6	82.1	6.6	11.4	6.4	5.0	88.5
Health education	59.5	50.8	8.7	40.5	22.0	18.5	72.8
Physical education	87.5	77.7	9.8	12.5	7.7	4.8	85.4
1993–94							
English	86.8	81.4	5.4	13.2	7.3	5.9	88.7
Foreign language	77.9	71.6	6.3	22.1	14.7	7.4	86.3
Mathematics	81.9	75.1	6.8	18.1	7.9	10.2	83.0
Science	90.1	83.0	7.1	9.9	6.3	3.6	89.3
Biology/life science	76.0	67.2	8.8	24.0	18.3	5.7	85.5
Physical science	54.9	48.4	6.5	45.1	32.7	12.4	81.1
Chemistry	62.1	58.0	4.2	37.9	27.9	10.0	85.9
Geology/earth/space science	37.7	32.3	5.4	62.3	34.9	27.4	67.2
Physics	50.6	43.6	7.0	49.4	33.7	15.7	77.3
Social science	89.5	80.7	8.8	10.5	6.3	4.2	87.0
History	54.8	49.2	5.5	45.2	37.8	7.5	87.0
ESL	29.8	25.2	4.6	70.2	41.4	28.8	68.6
Arts and music	89.3	81.8	7.5	10.8	4.4	6.3	86.2
Physical education/health education	92.1	85.1	7.0	7.9	4.4	3.5	89.5
1990–91							
English	86.9	78.8	8.0	13.2	7.3	5.9	86.1
Foreign language	68.4	59.9	8.4	31.6	23.4	8.2	83.4
Mathematics	82.0	75.0	7.0	18.0	8.8	9.2	83.8
Science	91.0	82.9	8.1	9.0	5.5	3.5	88.4
Biology/life science	71.4	60.0	11.4	28.6	22.4	6.2	82.4
Physical science	53.6	43.1	10.5	46.4	20.1	26.3	63.2
Chemistry	63.4	55.7	7.7	36.7	25.9	10.8	81.5
Geology/earth/space science	32.4	29.0	3.4	67.6	26.4	41.2	55.4
Physics	38.4	28.7	9.7	61.6	27.4	34.2	56.1
Social science	90.6	75.2	15.4	9.4	4.4	5.1	79.6
History	49.0	41.3	7.7	51.0	40.1	10.9	81.4
ESL	20.9	15.4	5.5	79.1	30.4	48.8	45.7
Arts and music	94.0	82.6	11.4	6.0	2.5	3.5	85.1
Physical education/health education	92.8	83.1	9.7	7.2	3.3	3.9	86.4
1987–88							
English	82.8	74.6	8.2	17.3	7.1	10.2	81.7
Mathematics	84.4	77.7	6.7	15.6	7.2	8.4	84.9
Science	87.4	80.3	7.0	12.6	5.0	7.7	85.3
Biology/life science	74.2	64.0	10.2	25.8	17.6	8.3	81.6
Physical science	53.0	39.2	13.8	47.0	16.0	30.9	55.3
Chemistry	62.5	51.0	11.5	37.5	22.1	15.5	73.1
Geology/earth/space science	27.2	22.3	4.9	72.8	21.3	51.5	43.6
Physics	43.4	28.8	14.6	56.6	20.1	36.5	48.9
Social science	88.1	80.0	8.1	11.9	5.5	6.4	85.5
History	54.5	50.8	3.7	45.5	33.4	12.1	84.2
ESL	21.1	18.1	3.0	78.9	23.5	55.4	41.6
Arts and music	94.8	87.8	7.0	5.2	3.1	2.2	90.9
Physical education/health education	90.1	79.1	11.1	9.9	4.9	5.0	83.9

NOTE: High school teachers include all teachers who taught any of grades 10–12, as well as teachers who taught grade 9 and no other grades. Not all assignment areas were measured in each SASS administration. Detail may not add to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 "Public Teacher Survey," 1990–91 "Public Teacher Survey, 1993–94 "Public Teacher Survey," 1999–2000 "Public Teacher Survey," and 1999–2000 "Public Charter Teacher Survey."

Table B–17.—Percentage of public school students that were taught by a middle level teacher with an undergraduate or graduate major or minor and certification in the course subject area, by course subject area: 1987–88 to 1999–2000

	Major/minor in field			No major/minor in field			Total
	Total	Certified	Not certified	Total	Certified	Not certified	Certified
1999–2000							
English	53.8	48.0	5.8	46.2	28.8	17.4	76.8
Foreign language	69.3	54.8	14.5	30.7	16.9	13.8	71.7
Mathematics	47.2	43.7	3.4	52.8	30.9	21.9	74.6
Science	59.4	49.9	9.4	40.6	26.5	14.2	76.4
Biology/life science	47.6	38.5	9.1	52.4	23.6	28.8	62.1
Physical science	16.1	13.6	2.6	83.9	43.4	40.5	57.0
Social science	68.1	57.7	10.4	31.9	18.6	13.3	76.3
History	42.0	36.5	5.5	58.0	46.5	11.5	83.0
ESL/bilingual education	38.6	27.9	10.7	61.4	25.3	36.1	53.2
Arts and music	95.1	88.3	6.8	4.9	2.4	2.5	90.7
Physical education/health education	87.8	82.6	5.3	12.2	8.8	3.4	91.4
Health education	49.1	47.8	1.3	50.9	30.0	21.0	77.8
Physical education	88.4	82.8	5.6	11.6	8.8	2.8	91.6
1993–94							
English	58.1	49.2	8.9	41.9	26.2	15.7	75.5
Foreign language	74.1	65.1	9.0	25.9	12.4	13.6	77.5
Mathematics	50.5	44.7	5.8	49.5	28.2	21.3	72.9
Science	60.1	54.3	5.7	40.0	25.2	14.8	79.5
Biology/life science	52.3	39.9	12.4	47.7	30.0	17.8	69.8
Physical science	25.0	22.3	2.7	75.0	46.7	28.3	69.0
Social science	70.2	56.7	13.5	29.8	16.4	13.3	73.2
History	39.7	35.2	4.4	60.3	46.1	14.3	81.3
ESL/bilingual education	33.9	29.6	4.3	66.1	20.6	45.5	50.2
Arts and music	90.7	87.3	3.4	9.3	4.4	5.0	91.6
Physical education/health education	88.1	82.7	5.4	11.9	5.3	6.6	87.9
1990–91							
English	55.9	48.6	7.2	44.1	25.2	18.9	73.9
Foreign language	60.9	50.2	10.8	39.1	23.4	15.7	73.5
Mathematics	48.9	43.6	5.3	51.2	32.5	18.7	76.1
Science	60.8	54.2	6.6	39.2	26.4	12.8	80.7
Biology/life science	43.9	33.6	10.3	56.2	33.7	22.5	67.3
Physical science	22.9	11.2	11.7	77.1	28.1	49.0	39.3
Social science	70.6	60.7	9.9	29.5	16.3	13.1	77.0
History	39.0	34.6	4.4	61.0	48.5	12.5	83.1
ESL/bilingual education	14.1	10.3	3.8	85.9	34.4	51.5	44.7
Arts and music	94.0	85.4	8.7	6.0	2.8	3.2	88.1
Physical education/health education	89.2	79.9	9.2	10.8	5.3	5.6	85.2
1987–88							
English	55.1	46.9	8.2	44.9	25.5	19.5	72.3
Mathematics	50.7	45.0	5.7	49.3	32.0	17.2	77.0
Science	57.6	51.4	6.2	42.4	26.1	16.3	77.5
Biology/life science	50.8	37.8	13.0	49.2	16.3	32.9	54.1
Physical science	25.6	13.8	11.8	74.4	31.5	43.0	45.3
Social science	73.0	63.6	9.3	27.1	14.3	12.7	77.9
History	44.2	40.2	4.0	55.8	40.6	15.2	80.8
ESL/bilingual education	31.3	25.8	5.4	68.7	27.6	41.2	53.4
Arts and music	95.3	89.9	5.4	4.7	2.7	2.0	92.6
Physical education/health education	87.8	81.0	6.8	12.3	6.4	5.8	87.4

NOTE: Middle level teachers include teachers who taught students in grades 5–9 and did not teach any students in grades 10–12; teachers who taught in grades 5–9 who identified themselves as elementary or special education teachers were classified as elementary level teachers. Not all assignment areas were measured in each SASS administration. Detail may not add to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 "Public Teacher Survey," 1990–91 "Public Teacher Survey, 1993–94 "Public Teacher Survey," 1999–2000 "Public Teacher Survey," and 1999–2000 "Public Charter Teacher Survey."

Table B–18.—Percentage of public school students that were taught by a high school grades (9–12) teacher with an undergraduate or graduate major or minor and certification in the course subject area, by year and course subject area: 1987–88 to 1999–2000

	Major/minor in field			No major/minor in field			
	Total	Certified	Not certified	Total	Certified	Not certified	Total Certified
1999–2000							
English	84.4	75.7	8.7	15.6	10.0	5.6	85.7
Foreign language	68.7	58.9	9.8	31.3	20.2	11.1	79.1
Mathematics	81.9	73.6	8.3	18.1	9.5	8.6	83.1
Science	86.4	76.7	9.6	13.6	8.1	5.5	84.8
Biology/life science	68.7	60.3	8.4	31.3	21.6	9.7	81.9
Physical science	54.1	47.0	7.1	45.9	30.4	15.5	77.4
Chemistry	61.4	52.5	8.9	38.6	29.2	9.4	81.7
Geology	28.5	24.2	4.3	71.5	35.2	36.3	59.4
Physics	49.5	40.3	9.3	50.5	33.4	17.0	73.7
Social science	86.0	76.4	9.6	14.0	8.1	5.9	84.5
History	47.1	42.1	4.9	52.9	44.6	8.4	86.7
ESL/bilingual education	41.7	32.7	9.0	58.3	27.2	31.1	59.9
Arts and music	91.5	82.1	9.4	8.5	3.6	5.0	8[illegible]
Physical education/health education	89.0	82.4	6.6	11.0	6.6	4.5	89.0
Health education	59.9	52.2	7.7	40.1	22.5	17.6	74.7
Physical education	87.8	77.6	10.2	12.2	7.4	4.8	85.0
1993–94							
English	84.5	78.9	5.6	15.5	7.3	8.3	86.2
Foreign language	78.6	72.3	6.3	21.4	14.5	6.9	86.8
Mathematics	79.8	73.1	6.7	20.2	7.8	12.5	80.9
Science	88.4	81.6	6.9	11.6	6.5	5.1	88.1
Biology/life science	75.0	66.3	8.7	25.0	17.8	7.3	84.0
Physical science	53.8	47.3	6.5	46.2	33.0	13.3	80.2
Chemistry	60.9	56.5	4.4	39.1	28.5	10.6	85.0
Geology	35.8	30.6	5.2	64.3	34.2	30.1	64.8
Physics	46.9	39.8	7.2	53.1	35.3	17.8	75.0
Social science	87.8	78.5	9.3	12.2	6.5	5.7	85.0
History	53.1	47.6	5.5	46.9	37.9	9.0	85.5
ESL/bilingual education	28.8	24.6	4.2	71.2	42.4	28.8	67.1
Arts and music	87.9	80.8	7.1	12.1	4.2	7.9	85.0
Physical education/health education	91.3	84.3	7.0	8.7	4.6	4.1	88.9
1990–91							
English	84.4	75.5	8.9	15.6	7.1	8.5	82.6
Foreign language	68.3	59.2	9.2	31.7	23.1	8.5	82.3
Mathematics	80.0	72.9	7.1	20.0	8.4	11.6	81.3
Science	89.2	81.1	8.2	10.8	5.5	5.3	86.5
Biology/life science	69.4	58.6	10.8	30.6	22.4	8.2	81.0
Physical science	52.6	40.9	11.7	47.4	20.3	27.1	61.3
Chemistry	59.4	50.8	8.6	40.6	27.4	13.2	78.2
Geology	31.1	27.3	3.8	68.9	25.6	43.4	52.8
Physics	36.3	26.1	10.2	63.8	26.1	37.7	52.2
Social science	89.1	73.1	16.0	10.9	4.3	6.6	77.4
History	49.2	40.6	8.6	50.8	39.1	11.8	79.7
ESL/bilingual education	23.6	17.7	5.9	76.4	28.4	48.0	46.1
Arts and music	92.9	80.8	12.0	7.2	2.7	4.5	83.5
Physical education/health education	91.7	81.4	10.2	8.3	3.6	4.8	85.0
1987–88							
English	80.2	71.3	8.9	19.8	6.8	13.0	78.1
Mathematics	81.8	75.3	6.6	18.2	7.1	11.1	82.3
Science	87.0	79.9	7.2	13.0	4.9	8.1	84.8
Biology/life science	73.1	63.3	9.8	26.9	17.6	9.3	81.0
Physical science	52.8	38.7	14.1	47.2	16.2	30.9	55.0
Chemistry	60.4	48.1	12.3	39.6	22.8	16.8	70.9
Geology	28.2	22.8	5.4	71.8	20.9	50.9	43.7
Physics	41.8	26.8	15.0	58.2	17.9	40.3	44.7
Social science	87.0	78.1	8.9	13.0	5.5	7.5	83.6
History	53.5	49.8	3.8	46.5	33.5	13.0	83.2
ESL/bilingual education	21.4	18.4	3.0	78.6	24.1	54.4	42.6
Arts and music	93.5	87.3	6.2	6.5	3.2	3.3	90.5
Physical education/health education	89.1	78.2	10.9	10.9	5.3	5.6	83.5

NOTE: High school teachers include all teachers who taught any of grades 10–12, as well as teachers who taught grade 9 and no other grades. Not all assignment areas were measured in each SASS administration. Detail may not add to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 "Public Teacher Survey," 1990–91 "Public Teacher Survey", 1993–94 "Public Teacher Survey 1999–2000 "Public Teacher Survey," and 1999–2000 "Public Charter Teacher Survey."

Appendix C: Standard Error Tables

Index to Standard Error Tables

	Major/Certification	Major/Minor/Certification
Measure 1: Main Assignment		
Elementary	C-2	C-11
Middle	C-3	C-12
Secondary	C-4	C-13
Measure 2: Subject Area Taught		
Middle	C-5	C-14
Secondary	C-6	C-15
Measure 3: Classes		
Secondary	C-7	C-16
Middle	C-8	C-17
Measure 4: Students		
Middle and Secondary	C-1	
Secondary	C-9	C-18
Middle	C-10	C-19

Table C-1.—Standard errors for table 1: percentage of public school students by grade levels taught and teacher's qualification status in course subject area: 1987–88 and 1999–2000

	Middle grades				High school grades			
	No major and certification		No major, minor, or certification		No major and certification		No major, minor, or certification	
Subject field	1987–1988	1999–2000	1987–1988	1999–2000	1987–1988	1999–2000	1987–1988	1999–2000
English	1.46	1.96	1.06	1.39	1.06	0.94	0.61	0.37
Foreign language	—	4.69	—	2.97	—	1.79	—	0.96
Mathematics	2.00	2.43	1.38	2.28	1.31	0.91	0.73	0.51
Science	1.66	2.56	1.13	1.61	1.19	1.33	0.58	0.49
Biology/life science	3.74	5.21	3.79	4.87	2.62	1.73	1.13	0.91
Physical Science	1.48	1.40	2.33	3.62	1.58	1.68	1.38	0.96
Chemistry	—	—	—	—	2.94	2.20	1.73	1.29
Geology/earth/space science	—	—	—	—	3.01	3.42	3.97	3.20
Physics	—	—	—	—	1.88	3.29	2.84	1.86
Social science	2.07	3.03	0.99	1.65	1.00	1.05	0.57	0.49
History	2.85	4.06	1.77	2.56	1.52	1.35	0.87	0.72
ESL/bilingual education	8.42	5.78	6.26	7.44	3.01	5.28	6.59	3.59
Arts and music	1.50	1.61	0.35	0.57	1.22	1.43	0.41	0.57
Physical education	1.44	2.51	0.54	0.57	1.22	1.18	0.52	0.43

— Not available

NOTE: Middle level teachers include teachers who taught students in grades 5-9 and did not teach any students in grades 10-12; teachers who taught in grades 5-9 who identified themselves as elementary or special education teachers were classified as elementary teachers. High school teachers include all teachers who taught any of grades 10-12, as well as teachers who taught grade 9 and no other grades. Not all assignment areas were measured in each SASS administration. See appendix A for notes and definition of terms.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 "Public Teacher Survey," 1999–2000 "Public Teacher Survey," and 1999–2000 "Public Charter Teacher Survey."

Table C-2.—Standard errors for table B-1: percentage of public school school teachers who taught elementary level grades with an undergraduate or graduate major and certification in their main assignment field, by main assignment field: 1987–88 to 1999–2000

	Major in field			No major in field			
	Total	Certified	Not certified	Total	Certified	Not certified	Total Certified
			1999–2000				
English	3.48	3.39	1.66	3.48	3.39	2.46	2.88
Foreign language	#	#	#	#	#	#	#
Mathematics	4.97	#	#	#	#	#	#
Science	#	#	#	4.97	10.09	8.53	#
Social science (including history)	#	#	#	#	#	#	#
Elementary education	0.70	0.68	0.29	#	#	#	#
ESL/bilingual education	4.96	4.83	2.33	0.70	0.67	0.27	0.41
Arts and music	2.58	3.03	1.99	4.96	4.61	2.41	2.85
Special education	1.85	2.10	0.91	2.58	2.02	1.87	2.50
Physical education/health education	4.92	5.14	3.13	1.85	1.54	1.00	1.30
Health education	#	#	#	4.92	5.09	2.44	4.08
Physical education	5.21	4.92	2.18	#	#	#	#
				5.21	4.44	3.35	4.00
			1993–94				
English	4.64	4.73	0.54	4.64	5.09	3.44	3.43
Foreign language	#	#	#	#	#	#	#
Mathematics	1.55	1.55	#	1.55	11.71	11.94	11.94
Science	#	#	#	#	#	#	#
Social science (including history)	#	#	#	#	#	#	#
Elementary education	0.68	0.75	0.29	0.68	0.61	0.37	0.46
ESL/bilingual education	3.88	3.72	1.44	3.88	5.42	4.33	5.01
Arts and music	3.68	#	#	3.68	0.64	3.63	#
Special education	1.39	1.69	1.01	1.39	1.13	1.12	1.41
Physical education/health education	3.22	2.93	1.76	3.22	#	#	#
			1990–91				
English	5.17	5.17	#	5.17	5.29	4.07	4.17
Foreign language	#	#	#	#	#	#	#
Mathematics	#	#	#	#	#	#	#
Science	#	#	#	#	#	#	#
Social science (including history)	#	#	#	#	#	#	#
Elementary education	0.66	0.68	0.21	0.66	0.58	0.26	0.37
ESL/bilingual education	2.93	2.53	2.10	2.93	3.99	5.11	5.13
Arts and music	5.44	6.43	3.84	5.44	5.26	2.93	4.83
Special education	1.71	1.94	1.05	1.71	1.61	1.33	1.74
Physical education/health education	3.74	5.11	3.98	3.74	#	#	#
			1987–88				
English	3.65	3.65	0.67	3.65	4.29	1.80	1.94
Mathematics	#	#	#	#	#	#	#
Science	#	#	#	#	#	#	#
Social science (including history)	#	#	#	#	#	#	#
Elementary education	0.58	0.53	0.33	0.58	0.53	0.15	0.38
ESL/bilingual education	3.89	4.19	1.88	3.89	4.49	3.33	3.47
Arts and music	4.27	5.19	2.60	4.27	3.87	2.12	3.32
Special education	1.80	1.96	0.82	1.80	1.91	0.72	1.12
Physical education/health education	4.39	#	#	4.39	#	#	3.60

# Too few sample cases for a reliable estimate.

NOTE: Elementary level teachers include teachers who taught only grades K–4, as well as other teachers who taught grades 5–9 but identified themselves as elementary or special education teachers. Not all assignment areas were measured in each SASS administration.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 "Public Teacher Survey," 1990–91 "Public Teacher Survey," 1993–94 "Public Teacher Survey," 1999–2000 "Public Teacher Survey," and 1999–2000 "Public Charter Teacher Survey."

Table C-3.—Standard errors for table B-2: percentage of public school teachers who taught middle level grades with an undergraduate or graduate major and certification in their main assignment field, by main assignment field: 1987–88 to 1999–2000

	Major in field			No major in field			
	Total	Certified	Not certified	Total	Certified	Not certified	Total Certified
				1999–2000			
English	1.89	2.04	0.53	1.89	1.64	1.25	1.40
Foreign language	5.60	5.21	3.94	5.60	5.70	1.47	3.95
Mathematics	2.23	2.27	0.52	2.23	2.38	1.65	1.70
Science	2.41	2.15	1.24	2.41	2.17	1.56	1.75
Biology/life science	4.67	4.61	1.18	4.67	4.99	3.29	3.32
Physical science	2.58	2.41	0.86	2.58	4.42	3.95	4.12
Social science (including history)	2.58	2.54	1.60	2.58	2.82	1.66	2.20
ESL/bilingual education	4.19	3.98	2.21	4.19	4.06	2.65	3.24
Arts and music	1.26	1.40	0.77	1.26	1.00	0.98	1.19
Physical education/health education	1.95	2.00	0.84	1.95	1.79	0.68	0.94
Health education	7.64	#	#	7.64	7.42	3.43	#
Physical education	2.09	2.15	0.94	2.09	1.95	0.70	1.05
				1993–94			
English	1.69	1.66	0.91	1.69	1.74	0.88	1.08
Foreign language	5.45	5.56	3.78	5.45	4.23	3.50	4.98
Mathematics	1.71	1.52	1.16	1.71	2.10	1.37	1.62
Science	2.63	2.56	0.93	2.63	2.34	1.58	1.71
Biology/life science	4.11	4.05	1.34	4.11	4.26	1.68	2.37
Physical science	1.45	#	#	1.45	2.46	2.01	#
Social science (including history)	2.13	2.20	1.19	2.13	2.18	0.95	1.56
ESL/bilingual education	3.29	3.17	0.74	3.29	5.48	5.02	4.93
Arts and music	0.69	1.37	1.13	0.69	0.56	0.51	1.21
Physical education/health education	1.24	1.49	0.82	1.24	1.25	0.67	1.06
				1990–91			
English	1.74	1.79	0.64	1.74	1.43	0.90	1.04
Foreign language	6.51	6.18	2.18	6.51	6.05	6.18	6.31
Mathematics	1.84	1.66	0.85	1.84	1.79	1.06	1.26
Science	2.68	2.59	0.97	2.68	2.65	1.02	1.28
Biology/life science	4.10	3.93	0.65	4.10	4.00	2.54	2.57
Physical science	3.63	#	#	3.63	4.95	4.00	#
Social science (including history)	2.34	2.34	0.88	2.34	2.23	0.94	1.25
ESL/bilingual education	3.34	2.63	1.55	3.34	3.88	2.59	2.87
Arts and music	0.83	1.28	1.21	0.83	0.79	0.20	1.21
Physical education/health education	1.33	1.50	0.97	1.33	0.87	0.81	1.21
				1987–88			
English	1.59	1.61	0.41	1.59	1.69	0.82	0.84
Mathematics	2.02	1.95	0.51	2.02	1.86	1.26	1.35
Science	1.68	1.62	0.69	1.68	1.70	0.94	1.13
Biology/life science	4.12	4.17	0.50	4.12	4.13	2.98	3.02
Physical science	2.74	2.72	0.60	2.74	3.09	2.38	2.46
Social science (including history)	2.12	2.17	0.58	2.12	1.90	0.67	0.73
ESL/bilingual education	2.69	2.48	1.05	2.69	3.21	2.45	2.30
Arts and music	1.10	1.26	0.67	1.10	1.07	0.20	0.72
Physical education/health education	1.00	1.32	0.78	1.00	1.03	0.41	0.85

# Too few sample cases for a reliable estimate.

NOTE: Middle level teachers include teachers who taught students in grades 5–9 and did not teach any students in grades 10–12; teachers who taught in grades 5–9 who identified themselves as elementary or special education teachers were classified as elementary level teachers. Not all assignment areas were measured in each SASS administration.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 "Public Teacher Survey," 1990–91 "Public Teacher Survey," 1993–94 "Public Teacher Survey," 1999–2000 "Public Teacher Survey," and 1999–2000 "Public Charter Teacher Survey."

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Table C-4.—Standard errors for table B-3: percentage of public school teachers who taught high school grades (9–12) with an undergraduate or graduate major and certification in their main assignment field, by main assignment field: 1987–88 to 1999–2000

	Major in field			No major in field			
	Total	Certified	Not certified	Total	Certified	Not certified	Total Certified
1999–2000							
English	0.72	0.85	0.55	0.72	0.70	0.31	0.63
Foreign language	1.76	1.62	0.79	1.76	1.57	0.86	0.88
Mathematics	0.86	0.86	0.49	0.86	0.79	0.42	0.67
Science	0.92	1.12	0.68	0.92	0.89	0.38	0.78
Biology/life science	1.57	1.57	0.82	1.57	1.51	0.81	1.14
Physical science	1.66	1.63	0.63	1.66	1.59	0.98	1.13
Chemistry	2.61	2.61	0.65	2.61	2.37	1.61	1.82
Geology/earth/space science	3.87	4.11	1.79	3.87	3.75	2.99	3.58
Physics	3.60	4.06	2.07	3.60	3.80	1.64	2.77
Social science (including history)	0.83	0.94	0.50	0.83	0.75	0.29	0.62
ESL/bilingual education	3.43	3.69	1.94	3.43	3.60	2.46	3.16
Arts and music	0.66	1.08	0.75	0.66	0.56	0.33	0.83
Physical education/health education	0.88	1.03	0.55	0.88	0.83	0.28	0.64
Health education	2.98	3.17	1.40	2.98	2.79	1.34	2.03
Physical education	1.08	1.18	0.54	1.08	1.04	0.23	0.59
1993–94							
English	0.74	0.78	0.37	0.74	0.65	0.30	0.43
Foreign language	1.38	1.50	0.55	1.38	1.22	0.46	0.69
Mathematics	0.81	0.93	0.50	0.81	0.73	0.36	0.60
Science	0.87	0.99	0.57	0.87	0.81	0.31	0.68
Biology/life science	1.62	1.58	0.58	1.62	1.55	0.48	0.76
Physical science	1.38	1.37	0.48	1.38	1.29	0.86	0.87
Chemistry	2.39	2.37	0.69	2.39	2.29	1.06	1.22
Geology/earth/space science	4.01	3.28	1.47	4.01	4.20	1.69	1.99
Physics	4.15	3.97	1.81	4.15	4.27	1.29	2.07
Social science (including history)	0.81	0.88	0.44	0.81	0.78	0.33	0.57
ESL/bilingual education	3.40	3.00	1.52	3.40	4.71	4.94	5.24
Arts and music	0.59	0.92	0.78	0.59	0.44	0.31	0.85
Physical education/health education	0.73	1.02	0.61	0.73	0.63	0.56	0.89
1990–91							
English	0.75	0.88	0.44	0.75	0.76	0.33	0.56
Foreign language	2.41	2.44	1.02	2.41	2.34	0.71	1.2
Mathematics	1.51	1.61	0.54	1.51	1.37	0.67	0.96
Science	1.28	1.40	0.55	1.28	1.28	0.27	0.64
Biology/life science	2.52	2.54	0.53	2.52	2.45	0.55	0.83
Physical science	2.38	2.31	0.52	2.38	2.47	0.94	1.05
Chemistry	3.54	3.58	0.50	3.54	3.45	1.04	1.12
Geology/earth/space science	6.05	#	#	6.05	5.49	3.82	#
Physics	4.85	4.68	1.65	4.85	5.07	2.42	2.92
Social science (including history)	1.12	1.33	0.69	1.12	1.09	0.27	0.72
ESL/bilingual education	3.69	3.78	1.08	3.69	4.33	3.62	3.5
Arts and music	0.87	1.37	1.08	0.87	0.75	0.38	1.21
Physical education/health education	0.85	1.10	0.70	0.85	0.89	0.23	0.72
1987–88							
English	0.97	1.04	0.38	0.97	0.96	0.24	0.46
Mathematics	1.02	1.20	0.55	1.02	1.01	0.46	0.68
Science	1.15	1.17	0.50	1.15	1.14	0.34	0.62
Biology/life science	2.61	2.37	0.86	2.61	2.59	0.33	0.77
Physical science	2.08	2.16	0.59	2.08	2.29	1.12	1.22
Chemistry	3.24	3.26	0.46	3.24	2.88	0.94	1.03
Geology/earth/space science	4.70	4.56	1.60	4.70	5.21	3.47	3.93
Physics	3.15	3.32	1.42	3.15	3.75	1.70	2.47
Social science (including history)	1.12	1.02	0.47	1.12	1.10	0.29	0.53
ESL/bilingual education	2.98	2.95	1.50	2.98	4.23	3.68	4.11
Arts and music	0.88	0.83	0.76	0.88	0.85	0.22	0.72
Physical education/health education	1.17	1.15	0.70	1.17	1.14	0.23	0.72

Too few sample cases for a reliable estimate.

NOTE: High school teachers include all teachers who taught any of grades 10–12, as well as teachers who taught grade 9 and no other grades. Not all assignment areas were measured in each SASS administration.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 "Public Teacher Survey," 1990–91 "Public Teacher Survey," 1993–94 "Public Teacher Survey," 1999–2000 "Public Teacher Survey," and 1999–2000 "Public Charter Teacher Survey."

Table C-5.—Standard errors for table B-4: percentage of public school middle level teachers with an undergraduate or graduate major and certification in any course taught, by course subject area: 1987–88 to 1999–2000

	Major in field			No major in field			Total
	Total	Certified	Not certified	Total	Certified	Not certified	Certified
1999–2000							
English	1.57	1.56	0.76	1.57	1.71	1.57	1.64
Foreign language	4.40	4.16	2.42	4.40	4.05	3.63	3.87
Mathematics	1.85	1.85	0.41	1.85	1.93	1.64	1.66
Science	2.13	2.09	1.03	2.13	2.05	1.97	2.07
Biology/life science	4.05	3.51	2.35	4.05	3.51	4.13	3.95
Physical science	1.49	1.30	0.59	1.49	3.13	3.00	2.94
Social science	2.03	1.94	1.29	2.03	2.16	2.05	2.23
History	2.53	2.29	1.10	2.53	3.31	2.97	3.07
ESL	4.71	4.43	2.44	4.71	3.95	4.01	4.34
Arts and music	1.75	1.92	0.91	1.75	0.86	1.56	1.76
Physical education/health education	1.93	1.98	0.96	1.93	1.60	1.21	1.43
Health education	4.00	3.98	0.35	4.00	5.14	4.32	4.30
Physical education	2.18	2.37	1.11	2.18	1.71	1.12	1.50
1993–94							
English	1.42	1.43	0.98	1.42	1.63	1.35	1.52
Foreign language	4.73	4.95	3.30	4.73	2.54	4.38	4.65
Mathematics	1.61	1.45	0.79	1.61	1.53	1.55	1.56
Science	1.96	2.04	0.71	1.96	1.94	1.26	1.40
Biology/life science	3.57	3.13	1.50	3.57	3.74	3.20	3.15
Physical science	1.92	1.85	0.38	1.92	3.19	2.78	2.87
Social science	1.75	1.69	0.96	1.75	2.04	2.33	2.37
History	2.70	2.50	1.43	2.70	2.91	2.89	2.72
ESL	5.01	5.79	2.18	5.01	5.80	5.93	5.90
Arts and music	1.96	2.19	1.11	1.96	1.24	1.74	1.90
Physical education/health education	2.35	2.34	1.17	2.35	1.65	1.81	1.91
1990–91							
English	1.69	1.67	0.74	1.69	1.36	1.61	1.80
Foreign language	5.67	4.77	3.11	5.67	5.28	4.02	4.20
Mathematics	1.78	1.53	0.81	1.78	1.62	2.20	1.87
Science	2.16	2.16	0.78	2.16	2.40	1.41	1.61
Biology/life science	3.01	2.72	1.84	3.01	3.16	3.24	3.29
Physical science	2.25	1.44	1.69	2.25	2.83	3.46	3.04
Social science	2.36	2.19	1.14	2.36	1.37	1.68	1.81
History	2.93	2.88	1.04	2.93	2.98	2.48	2.45
ESL	2.73	2.16	1.64	2.73	6.37	6.59	6.37
Arts and music	1.87	2.26	1.85	1.87	1.08	1.54	2.41
Physical education/health education	1.96	2.38	1.70	1.96	1.13	1.84	2.42
1987–88							
English	1.30	1.21	0.54	1.30	1.16	1.18	1.18
Mathematics	1.91	1.70	0.63	1.91	1.58	1.48	1.44
Science	1.63	1.51	0.72	1.63	1.30	1.34	1.46
Biology/life science	2.14	2.58	1.34	2.14	2.57	3.18	3.80
Physical science	1.68	1.22	1.19	1.68	2.25	2.19	2.14
Social science	1.75	1.85	0.78	1.75	1.48	1.58	1.66
History	2.33	2.29	1.07	2.33	2.57	2.19	2.36
ESL	5.34	5.36	1.00	5.34	4.83	5.92	5.68
Arts and music	1.25	1.61	0.77	1.25	1.11	0.81	1.17
Physical education/health education	1.20	1.48	0.88	1.20	0.99	1.32	1.36

NOTE: Middle level teachers include teachers who taught students in grades 5–9 and did not teach any students in grades 10–12; teachers who taught in grades 5–9 who identified themselves as elementary or special education teachers were classified as elementary level teachers. Not all assignment areas were measured in each SASS administration.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 "Public Teacher Survey," 1990–91 "Public Teacher Survey," 1993–94 "Public Teacher Survey," 1999–2000 "Public Teacher Survey," and 1999–2000 "Public Charter Teacher Survey."

Table C–6.—Standard errors for table B–5: percentage of public high school grades (9–12) teachers with an undergraduate or graduate major and certification in any course taught, by course subject area: 1987–88 to 1999–2000

	Major in field			No major in field			
	Total	Certified	Not certified	Total	Certified	Not certified	Total Certified
			1999–2000				
English	0.76	0.82	0.58	0.76	0.64	0.58	0.73
Foreign language	1.59	1.51	0.56	1.59	1.24	1.09	1.06
Mathematics	0.80	0.78	0.47	0.80	0.66	0.70	0.83
Science	0.96	1.12	0.61	0.96	0.83	0.67	0.94
Biology/life science	1.46	1.35	0.86	1.46	1.27	1.13	1.35
Physical science	1.33	1.27	0.55	1.33	1.19	1.20	1.22
Chemistry	2.01	1.97	1.07	2.01	1.92	1.81	2.01
Geology/earth/space science	1.92	1.88	0.95	1.92	2.21	2.46	2.56
Physics	2.19	2.15	1.29	2.19	2.15	2.22	2.39
Social science	0.78	0.86	0.58	0.78	0.62	0.63	0.84
History	1.07	1.02	0.40	1.07	1.08	0.97	1.06
ESL	2.89	2.89	1.77	2.89	3.26	3.01	3.18
Arts and Music	1.11	1.38	0.88	1.11	0.68	0.83	1.20
Physical education/health education	1.02	1.23	0.76	1.02	0.75	0.83	1.08
Health education	2.13	2.16	0.86	2.13	1.90	2.01	2.28
Physical education	1.14	1.39	1.04	1.14	0.86	0.84	1.22
			1993–94				
English	0.75	0.88	0.30	0.75	0.54	0.57	0.69
Foreign language	1.64	1.63	0.55	1.64	1.28	1.14	1.21
Mathematics	0.87	0.98	0.35	0.87	0.59	0.73	0.87
Science	0.89	0.99	0.50	0.89	0.67	0.63	0.84
Biology/life science	1.37	1.39	0.65	1.37	1.11	1.03	1.13
Physical science	0.98	1.03	0.52	0.98	1.04	0.98	1.07
Chemistry	1.85	1.81	0.71	1.85	1.76	1.54	1.63
Geology/earth/space science	2.06	1.89	0.76	2.06	2.43	2.24	2.20
Physics	2.04	1.91	1.03	2.04	2.32	1.82	1.92
Social science	0.77	0.82	0.50	0.77	0.57	0.59	0.80
History	1.16	1.08	0.47	1.16	1.24	0.80	0.94
ESL	2.65	2.38	1.35	2.65	3.32	2.56	2.98
Arts and Music	0.98	1.16	0.76	0.98	0.57	0.85	1.14
Physical education/health education	0.92	1.07	0.71	0.92	0.68	0.81	1.03
			1990–91				
English	1.04	0.92	0.50	1.04	0.63	1.07	0.99
Foreign language	1.89	1.92	1.12	1.89	2.11	1.32	1.71
Mathematics	1.10	1.29	0.63	1.10	0.98	1.17	1.28
Science	1.25	1.35	0.54	1.25	1.12	0.87	1.01
Biology/life science	1.72	1.78	1.41	1.72	1.58	1.62	1.89
Physical science	1.50	1.39	0.72	1.50	1.52	1.50	1.50
Chemistry	2.45	2.51	0.90	2.45	2.77	2.33	2.32
Geology/earth/space science	3.08	2.68	1.42	3.08	2.18	3.08	2.72
Physics	1.65	1.72	1.19	1.65	3.40	3.18	3.32
Social science	1.26	1.30	1.16	1.26	0.85	0.98	1.23
History	1.55	1.46	0.87	1.55	1.35	1.12	1.33
ESL	2.74	2.42	1.51	2.74	3.72	4.20	4.47
Arts and Music	1.52	1.54	1.12	1.52	0.75	1.33	1.34
Physical education/health education	1.69	1.77	1.23	1.69	0.69	1.77	1.71
			1987–88				
English	1.06	1.09	0.69	1.06	0.67	0.83	0.86
Mathematics	1.10	1.17	0.49	1.10	0.71	1.01	1.00
Science	1.18	1.11	0.47	1.18	0.93	0.93	0.96
Biology/life science	2.53	2.20	1.43	2.53	1.92	1.72	1.77
Physical science	1.34	1.19	0.69	1.34	1.33	1.45	1.29
Chemistry	2.28	2.39	1.26	2.28	2.26	2.27	1.83
Geology/earth/space science	2.13	2.03	1.12	2.13	2.70	3.01	3.09
Physics	1.84	1.03	1.62	1.84	1.74	2.29	2.06
Social science	1.07	0.99	0.58	1.07	0.83	0.97	1.05
History	1.25	1.10	0.48	1.25	1.34	1.03	1.13
ESL	2.34	2.48	1.45	2.34	4.08	5.22	5.26
Arts and Music	1.13	1.29	0.99	1.13	0.74	0.89	1.18
Physical education/health education	1.39	1.18	1.15	1.39	0.90	0.96	1.10

NOTE: High school teachers include all teachers who taught any of grades 10–12, as well as teachers who taught grade 9 and no other grades. Not all assignment areas were measured in each SASS administration.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 "Public Teacher Survey," 1990–91 "Public Teacher Survey," 1993–94 "Public Teacher Survey," 1999–2000 "Public Teacher Survey," and 1999–2000 "Public Charter Teacher Survey."

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Table C-7.—Standard errors for table B-8: percentage of public school courses taught by a middle level teacher with an undergraduate or graduate major and certification in the course subject area, by course subject area: 1987–88 to 1999–2000

	Major in field			No major in field			
	Total	Certified	Not certified	Total	Certified	Not certified	Total Certified
				1999–2000			
English	1.91	1.85	0.68	1.91	1.93	1.53	1.60
Foreign language	5.11	4.97	3.06	5.11	5.72	2.98	4.30
Mathematics	2.30	2.30	0.65	2.30	2.31	2.28	2.33
Science	2.55	2.55	1.12	2.55	2.32	1.93	2.12
Biology/life science	5.11	4.75	2.17	5.11	3.90	4.41	4.29
Physical science	1.59	1.52	0.51	1.59	3.68	3.38	3.45
Social science	2.43	2.68	1.67	2.43	2.41	1.74	2.32
History	3.73	3.76	0.67	3.73	4.46	3.43	3.47
ESL	9.42	5.90	9.53	9.42	6.43	6.89	7.91
Arts and music	1.73	1.74	0.89	1.73	1.15	1.57	1.59
Physical education/health education	2.00	2.07	1.05	2.00	1.92	0.58	1.12
Health education	7.05	7.05	0.15	7.05	8.08	4.39	4.45
Physical education	2.37	2.57	1.24	2.37	2.20	0.55	1.29
				1993–94			
English	1.85	1.91	0.97	1.85	1.96	1.02	1.37
Foreign language	4.97	5.47	4.24	4.97	2.78	4.17	5.17
Mathematics	2.01	1.91	1.09	2.01	2.04	1.68	1.86
Science	2.23	2.43	1.26	2.23	1.92	1.17	1.78
Biology/life science	4.25	3.88	1.89	4.25	4.37	3.32	3.51
Physical science	2.50	2.44	0.53	2.50	3.65	3.08	3.21
Social science	1.87	2.41	2.53	1.87	2.10	1.68	2.78
History	2.89	2.83	1.80	2.89	3.08	2.37	2.69
ESL	7.86	7.90	0.59	7.86	5.55	8.26	8.14
Arts and music	1.65	1.74	0.57	1.65	1.40	0.89	1.00
Physical education/health education	1.79	1.83	1.35	1.79	1.24	1.12	1.60
				1990–91			
English	1.95	1.96	0.78	1.95	1.80	1.39	1.61
Foreign language	7.58	6.99	2.69	7.58	7.40	3.33	4.14
Mathematics	2.06	1.84	0.78	2.06	1.97	1.64	1.40
Science	2.78	2.75	0.86	2.78	2.84	1.12	1.38
Biology/life science	3.35	3.39	1.26	3.35	3.63	3.29	3.40
Physical science	2.69	2.07	1.82	2.69	4.06	4.30	4.28
Social science	2.43	2.35	1.33	2.43	1.83	1.46	1.80
History	3.75	3.64	0.94	3.75	3.60	2.14	2.12
ESL	4.17	2.66	3.38	4.17	8.39	8.16	8.36
Arts and music	1.24	2.29	2.32	1.24	1.01	0.81	2.39
Physical education/health education	1.55	2.05	1.69	1.55	1.38	0.83	1.85
				1987–88			
English	1.49	1.51	0.57	1.49	1.45	1.03	1.22
Mathematics	2.09	1.90	0.81	2.09	1.78	1.44	1.57
Science	1.99	2.00	0.81	1.99	1.98	1.44	1.77
Biology/life science	3.27	3.74	1.53	3.27	3.47	3.96	4.58
Physical science	1.98	1.53	1.33	1.98	2.98	2.72	2.90
Social science	1.95	2.09	0.76	1.95	1.64	1.08	1.36
History	2.89	2.89	0.96	2.89	2.91	1.97	2.06
ESL	6.96	7.07	1.02	6.96	5.99	7.43	7.43
Arts and music	1.40	1.68	0.68	1.40	1.28	0.53	0.91
Physical education/health education	1.14	1.57	0.78	1.14	1.22	0.75	1.19

NOTE: Middle level teachers include teachers who taught students in grades 5–9 and did not teach any students in grades 10–12; teachers who taught in grades 5–9 who identified themselves as elementary or special education teachers were classified as elementary level teachers. Not all assignment areas were measured in each SASS administration.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 "Public Teacher Survey," 1990–91 "Public Teacher Survey," 1993–94 "Public Teacher Survey," 1999–2000 "Public Teacher Survey," and 1999–2000 "Public Charter Teacher Survey."

Table C-8.—Standard errors table B-7: percentage of public school courses taught by a high school grades (9–12) teacher with an undergraduate or graduate major and certification in the course subject area, by course subject area: 1987–88 to 1999–2000

	Major in field			No major in field			
	Total	Certified	Not certified	Total	Certified	Not certified	Total Certified
1999–2000							
English	0.69	0.87	0.68	0.69	0.68	0.50	0.80
Foreign language	1.60	1.55	0.72	1.60	1.31	1.05	1.05
Mathematics	0.84	0.86	0.58	0.84	0.70	0.56	0.82
Science	1.04	1.22	0.64	1.04	0.90	0.53	0.85
Biology/life science	1.58	1.52	0.84	1.58	1.48	0.96	1.26
Physical science	1.57	1.54	0.58	1.57	1.26	1.15	1.20
Chemistry	2.10	2.13	0.70	2.10	2.02	1.70	1.83
Geology/earth/space science	3.15	3.13	0.72	3.15	3.18	3.35	3.37
Physics	2.64	2.89	1.78	2.64	2.63	2.11	2.77
Social science	0.77	0.95	0.59	0.77	0.71	0.53	0.79
History	1.31	1.27	0.40	1.31	1.27	0.89	0.94
ESL	3.87	4.54	2.62	3.87	4.07	3.44	4.37
Arts and music	1.13	1.51	0.94	1.13	0.92	0.57	1.05
Physical education/health education	0.79	1.12	0.75	0.79	0.70	0.44	0.85
Health education	2.53	2.66	1.32	2.53	2.53	1.81	2.26
Physical education	1.16	1.58	1.29	1.16	1.04	0.60	1.27
1993–94							
English	0.75	0.88	0.36	0.75	0.66	0.39	0.60
Foreign language	1.80	1.85	0.65	1.80	1.64	1.16	1.29
Mathematics	0.95	1.07	0.49	0.95	0.73	0.71	0.87
Science	1.02	1.14	0.59	1.02	0.92	0.41	0.80
Biology/life science	1.68	1.59	0.75	1.68	1.46	0.95	1.10
Physical science	1.14	1.35	0.60	1.14	1.17	0.85	1.06
Chemistry	2.56	2.58	0.44	2.56	2.21	1.40	1.41
Geology/earth/space science	3.75	3.28	1.81	3.75	3.54	2.51	2.43
Physics	3.56	3.54	1.25	3.56	3.52	1.90	2.07
Social science	0.78	0.98	0.56	0.78	0.66	0.62	0.89
History	1.41	1.38	0.75	1.41	1.37	0.87	1.15
ESL	4.11	3.94	1.91	4.11	4.11	3.09	3.63
Arts and music	0.96	1.11	0.93	0.96	0.72	0.49	1.01
Physical education/health education	0.95	1.34	0.89	0.95	0.70	0.74	1.24
1990–91							
English	0.86	0.87	0.44	0.86	0.80	0.55	0.63
Foreign language	1.99	2.06	1.03	1.99	2.28	1.22	1.42
Mathematics	1.32	1.64	0.66	1.32	1.24	1.07	1.41
Science	1.28	1.40	0.60	1.28	1.25	0.48	0.73
Biology/life science	2.11	2.07	1.40	2.11	1.94	1.15	1.66
Physical science	2.38	2.44	0.90	2.38	2.07	1.71	1.76
Chemistry	5.11	5.16	0.89	5.11	4.60	1.86	1.96
Geology/earth/space science	4.90	4.77	1.45	4.90	4.15	4.27	4.19
Physics	3.21	3.33	1.41	3.21	4.61	3.30	3.97
Social science	1.18	1.43	1.03	1.18	0.95	0.65	1.22
History	1.97	1.87	0.92	1.97	1.78	1.18	1.48
ESL	2.65	2.75	1.01	2.65	4.63	4.98	5.03
Arts and music	0.99	1.55	1.25	0.99	0.75	0.58	1.35
Physical education/health education	1.07	1.28	0.95	1.07	0.85	0.67	1.11
1987–88							
English	1.09	1.06	0.46	1.09	0.91	0.60	0.63
Mathematics	1.38	1.58	0.59	1.38	1.24	0.65	0.80
Science	1.27	1.21	0.67	1.27	1.17	0.70	0.90
Biology/life science	2.97	2.66	1.68	2.97	2.67	1.25	1.84
Physical science	2.02	1.74	0.98	2.02	1.74	1.70	1.61
Chemistry	3.30	3.60	1.03	3.30	3.06	2.35	2.21
Geology/earth/space science	3.31	3.15	1.34	3.31	3.82	4.65	4.72
Physics	2.83	2.36	1.92	2.83	3.28	3.43	3.77
Social science	1.18	1.12	0.52	1.18	0.89	0.72	0.79
History	1.66	1.50	0.46	1.66	1.67	1.09	1.12
ESL	2.79	2.91	0.99	2.79	6.79	7.40	7.57
Arts and music	0.87	1.54	1.50	0.87	0.79	0.29	1.48
Physical education/health education	1.41	1.48	1.38	1.41	1.25	0.56	1.24

NOTE: High school teachers include all teachers who taught any of grades 10–12, as well as teachers who taught grade 9 and no other grades. Not all assignment areas were measured in each SASS administration.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 "Public Teacher Survey," 1990–91 "Public Teacher Survey," 1993–94 "Public Teacher Survey," 1999–2000 "Public Teacher Survey," and 1999–2000 "Public Charter Teacher Survey."

Table C-9.—Standard errors for table B-8: percentage of public school students that were taught by a middle level teacher with an undergraduate or graduate major and certification in the course subject area, by course subject area: 1987–88 to 1999–2000

	Major in field			No major in field			
	Total	Certified	Not certified	Total	Certified	Not certified	Total Certified
1999–2000							
English	1.96	1.96	0.61	1.96	2.00	1.43	1.50
Foreign language	4.90	4.69	2.96	4.90	5.57	3.53	4.53
Mathematics	2.42	2.43	0.79	2.42	2.75	2.34	2.42
Science	2.69	2.56	1.30	2.69	2.37	1.87	2.06
Biology/life science	5.63	5.21	2.28	5.63	4.06	4.78	4.64
Physical science	1.46	1.40	0.41	1.46	3.81	3.57	3.63
Social science	2.77	3.03	1.73	2.77	2.81	1.78	2.49
History	4.03	4.06	0.82	4.03	4.85	3.52	3.58
ESL/bilingual education	7.24	5.78	5.49	7.24	4.78	7.44	6.75
Arts and music	1.61	1.61	0.83	1.61	1.19	1.35	1.38
Physical education/health education	2.42	2.51	1.41	2.42	2.36	0.58	1.42
Health education	7.29	7.30	0.13	7.29	8.02	4.20	4.25
Physical education	2.79	3.01	1.58	2.79	2.66	0.56	1.59
1993–94							
English	1.87	1.75	1.17	1.87	1.99	1.15	1.45
Foreign language	5.21	6.07	4.13	5.21	3.04	3.77	5.01
Mathematics	1.89	1.80	1.01	1.89	1.94	1.51	1.66
Science	2.23	2.38	1.12	2.23	1.95	1.32	1.73
Biology/life science	4.03	3.61	1.78	4.03	4.17	3.29	3.44
Physical science	2.42	2.36	0.53	2.42	3.56	2.96	3.10
Social science	1.81	2.35	2.39	1.81	2.04	1.77	2.77
History	2.70	2.64	1.79	2.70	2.96	2.51	2.70
ESL/bilingual education	8.80	9.64	1.33	8.80	6.16	7.34	7.82
Arts and music	1.63	1.82	0.68	1.63	1.49	0.70	0.99
Physical education/health education	1.82	1.82	1.10	1.82	1.38	1.08	1.39
1990–91							
English	1.84	1.80	0.69	1.84	1.59	1.26	1.41
Foreign language	6.91	6.30	2.69	6.91	6.52	3.33	4.04
Mathematics	2.05	1.82	0.79	2.05	1.87	1.72	1.43
Science	2.65	2.60	0.87	2.65	2.67	0.93	1.24
Biology/life science	3.34	3.36	1.39	3.34	3.55	2.88	3.03
Physical science	2.68	1.97	1.96	2.68	3.94	4.23	4.17
Social science	2.29	2.22	0.94	2.29	1.76	1.31	1.53
History	3.40	3.35	0.84	3.40	3.34	1.94	1.99
ESL/bilingual education	3.51	3.00	2.05	3.51	7.73	7.60	7.59
Arts and music	1.25	2.29	2.31	1.25	1.10	0.75	2.40
Physical education/health education	1.61	2.01	1.54	1.61	1.43	0.91	1.78
1987–88							
English	1.49	1.46	0.53	1.49	1.35	1.05	1.16
Mathematics	2.12	2.00	0.75	2.12	1.71	1.36	1.47
Science	1.74	1.66	0.75	1.74	1.60	1.05	1.30
Biology/life science	3.33	3.74	1.48	3.33	3.14	3.87	4.42
Physical science	2.00	1.48	1.52	2.00	2.91	2.44	2.67
Social science	1.90	2.07	0.63	1.90	1.67	1.03	1.23
History	2.83	2.85	0.74	2.83	2.93	1.82	1.86
ESL/bilingual education	8.27	8.42	1.05	8.27	5.92	6.28	6.24
Arts and music	1.17	1.50	0.82	1.17	1.13	0.37	0.92
Physical education/health education	1.06	1.44	0.62	1.06	1.05	0.73	1.02

NOTE: Middle level teachers include teachers who taught students in grades 5–9 and did not teach any students in grades 10–12; teachers who taught in grades 5–9 who identified themselves as elementary or special education teachers were classified as elementary level teachers. Not all assignment areas were measured in each SASS administration.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 "Public Teacher Survey," 1990–91 "Public Teacher Survey," 1993–94 "Public Teacher Survey," 1999–2000 "Public Teacher Survey," and 1999–2000 "Public Charter Teacher Survey."

Table C-10.—Standard errors for table B-9: percentage of public school students that were taught by a high school grades (9–12) teacher with an undergraduate or graduate major and certification in the the course subject area, by course subject area: 1987–88 to 1999–2000

	Major in field			No major in field			
	Total	Certified	Not certified	Total	Certified	Not certified	Total Certified
1999–2000							
English	0.76	0.94	0.70	0.76	0.79	0.43	0.83
Foreign language	1.81	1.79	0.83	1.81	1.43	1.21	1.26
Mathematics	0.90	0.91	0.57	0.90	0.76	0.56	0.82
Science	1.15	1.33	0.73	1.15	1.07	0.50	0.85
Biology/life science	1.75	1.73	0.97	1.75	1.57	1.06	1.36
Physical science	1.69	1.68	0.59	1.69	1.38	1.09	1.17
Chemistry	2.20	2.20	0.76	2.20	2.13	1.58	1.71
Geology	3.43	3.42	0.78	3.43	3.70	3.29	3.42
Physics	2.81	3.29	1.85	2.81	2.98	1.90	2.82
Social science	0.87	1.05	0.65	0.87	0.82	0.50	0.80
History	1.39	1.35	0.43	1.39	1.40	0.87	0.92
ESL/bilingual education	4.57	5.28	3.17	4.57	4.26	3.59	4.78
Arts and music	1.02	1.43	0.96	1.02	0.80	0.60	1.08
Physical education/health education	0.84	1.18	0.77	0.84	0.76	0.43	0.87
Health education	2.80	2.97	1.08	2.80	2.69	1.95	2.29
Physical education	1.10	1.73	1.43	1.10	0.93	0.64	1.44
1993–94							
English	0.69	0.81	0.32	0.69	0.59	0.42	0.58
Foreign language	1.60	1.68	0.60	1.60	1.47	0.80	0.99
Mathematics	0.86	1.00	0.40	0.86	0.63	0.68	0.85
Science	0.94	1.09	0.53	0.94	0.81	0.49	0.83
Biology/life science	1.63	1.55	0.67	1.63	1.42	1.20	1.24
Physical science	1.09	1.27	0.56	1.09	1.12	0.87	1.04
Chemistry	2.45	2.45	0.43	2.45	2.17	1.46	1.49
Geology	3.44	2.84	1.76	3.44	3.34	2.51	2.38
Physics	3.02	3.09	1.05	3.02	3.27	1.69	1.90
Social science	0.80	0.94	0.56	0.80	0.69	0.58	0.85
History	1.33	1.30	0.72	1.33	1.33	0.90	1.14
ESL/bilingual education	3.43	3.25	1.49	3.43	3.39	2.55	2.99
Arts and music	0.91	1.06	0.81	0.91	0.58	0.67	1.00
Physical education/health education	0.80	1.15	0.72	0.80	0.62	0.48	0.94
1990–91							
English	0.86	0.79	0.50	0.86	0.73	0.66	0.68
Foreign language	2.05	2.15	0.98	2.05	2.22	1.15	1.46
Mathematics	1.17	1.43	0.61	1.17	1.01	1.02	1.24
Science	1.20	1.26	0.56	1.20	1.18	0.58	0.77
Biology/life science	1.85	1.98	0.94	1.85	1.78	1.21	1.48
Physical science	1.63	1.62	0.87	1.63	1.77	1.52	1.56
Chemistry	3.22	3.30	0.80	3.22	3.37	1.70	1.80
Geology	4.63	4.44	1.47	4.63	3.60	3.80	3.69
Physics	3.18	3.19	1.19	3.18	4.53	3.09	3.61
Social science	1.12	1.26	1.02	1.12	0.94	0.62	1.18
History	1.84	1.78	0.90	1.84	1.64	1.11	1.42
ESL/bilingual education	2.54	2.59	1.02	2.54	4.22	4.52	4.56
Arts and music	1.21	1.63	1.18	1.21	0.77	0.74	1.34
Physical education/health education	1.10	1.36	0.99	1.10	0.81	0.74	1.17
1987–88							
English	1.03	1.06	0.54	1.03	0.78	0.64	0.73
Mathematics	1.18	1.31	0.55	1.18	0.91	0.81	0.88
Science	1.16	1.19	0.47	1.16	1.06	0.69	0.85
Biology/life science	2.93	2.62	1.17	2.93	2.56	1.22	1.45
Physical science	1.81	1.58	0.78	1.81	1.62	1.71	1.53
Chemistry	2.64	2.94	1.06	2.64	2.89	2.22	1.95
Geology	3.08	3.01	1.17	3.08	3.42	4.12	4.21
Physics	2.57	1.88	1.79	2.57	3.06	2.86	3.13
Social science	1.04	1.00	0.48	1.04	0.91	0.68	0.77
History	1.68	1.52	0.42	1.68	1.60	0.86	0.93
ESL/bilingual education	2.66	3.01	0.85	2.66	5.92	6.68	6.93
Arts and music	0.84	1.22	1.14	0.84	0.70	0.42	1.10
Physical education/health education	1.21	1.22	0.94	1.21	1.08	0.59	1.00

NOTE: High school teachers include all teachers who taught any of grades 10–12, as well as teachers who taught grade 9 and no other grades. Not all assignment areas were measured in each SASS administration.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 "Public Teacher Survey," 1990–91 "Public Teacher Survey," 1993–94 "Public Teacher Survey," 1999–2000 "Public Teacher Survey," and 1999–2000 "Public Charter Teacher Survey."

Table C-11.—Standard errors for table B-10:percentage of public school teachers who taught elementary level grades with an undergraduate or graduate major or minor and certification in their main assignment field, by main assignment field: 1987–88 to 1999–2000

	Major/minor in field			No major/minor in field			
	Total	Certified	Not certified	Total	Certified	Not certified	Total Certified
				1999–2000			
English	3.35	3.32	1.99	3.35	3.06	2.49	2.88
Foreign language	#	#	#	#	#	#	#
Mathematics	5.16	#	#	5.16	10.29	8.53	9.23
Science	#	#	#	#	#	#	#
Social science (including history)	#	#	#	#	#	#	#
Elementary education	0.68	0.67	0.28	0.68	0.66	0.26	0.41
ESL/bilingual education	4.80	4.63	2.46	4.80	4.40	2.28	2.85
Arts and music	2.17	2.72	1.99	2.17	1.51	1.87	2.50
Special education	1.64	1.90	0.96	1.64	1.29	0.98	1.30
Physical education/health education	4.92	5.14	3.13	4.92	5.09	2.44	4.08
Health education	#	#	#	#	#	#	#
Physical education	5.22	4.93	2.18	5.22	4.43	3.35	4.00
				1993–94			
English	5.23	5.12	1.47	5.23	5.49	3.19	3.43
Foreign language	#	#	#	#	#	#	#
Mathematics	4.99	#	#	4.99	11.89	12.58	11.94
Science	#	#	#	#	#	#	#
Social science (including history)	#	#	#	#	#	#	#
Elementary education	0.62	0.71	0.28	0.62	0.56	0.35	0.46
ESL/bilingual education	4.48	4.49	1.72	4.48	5.59	4.07	5.01
Arts and music	3.67	#	#	3.67	0.48	3.63	3.67
Special education	1.44	1.69	1.02	1.44	1.12	1.07	1.41
Physical education/health education	3.20	2.92	1.76	3.20	#	#	1.76
				1990–91			
English	5.86	5.31	2.35	5.86	5.63	3.12	4.17
Foreign language	#	#	#	#	#	#	#
Mathematics	#	#	#	#	#	#	#
Science	#	#	#	#	#	#	#
Social science (including history)	#	#	#	#	#	#	#
Elementary education	0.61	0.63	0.25	0.61	0.53	0.27	0.37
ESL/bilingual education	2.77	2.85	2.12	2.77	4.21	5.02	5.13
Arts and music	5.38	6.37	4.39	5.38	5.26	2.20	4.83
Special education	1.70	2.07	1.21	1.70	1.42	1.18	1.74
Physical education/health education	2.47	4.58	4.00	2.47	#	#	4.57
				1987–88			
English	4.87	4.88	0.67	4.87	5.64	1.80	1.94
Mathematics	#	#	#	#	#	#	#
Science	#	#	#	#	#	#	#
Social science (including history)	#	#	#	#	#	#	#
Elementary education	0.56	0.50	0.35	0.56	0.53	0.14	0.38
ESL/bilingual education	4.57	4.89	1.88	4.57	4.38	3.26	3.47
Arts and music	3.65	5.11	2.66	3.65	3.18	2.00	3.32
Special education	1.23	1.49	0.90	1.23	1.28	0.64	1.12
Physical education/health education	4.40	#	#	4.40	#	#	3.60

# Too few sample cases for a reliable estimate.

NOTE: Elementary level teachers include teachers who taught only grades K–4, as well as other teachers who taught grades 5–9 but identified themselves as elementary or special education teachers. Not all assignment areas were measured in each SASS administration.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 "Public Teacher Survey," 1990–91 "Public Teacher Survey," 1993–94 "Public Teacher Survey," 1999–2000 "Public Teacher Survey," and 1999–2000 "Public Charter Teacher Survey."

Table C-12.—Standard errors for table B-11: percentage of public school teachers who taught middle level grades with an undergraduate or graduate major or minor and certification in their main assignment field, by main assignment field: 1987–88 to 1999–2000

	Major/minor in field			No major/minor in field			
	Total	Certified	Not certified	Total	Certified	Not certified	Total Certified
				1999–2000			
English	2.00	2.18	0.58	2.00	1.69	1.16	1.40
Foreign language	4.66	4.50	3.93	4.66	4.47	1.30	3.95
Mathematics	2.32	2.35	0.60	2.32	2.11	1.61	1.70
Science	2.18	1.93	1.29	2.18	2.07	1.51	1.75
Biology/life science	4.47	4.42	1.24	4.47	4.89	3.31	3.32
Physical science	3.84	3.83	0.86	3.84	4.81	3.97	4.12
Social science (including history)	2.27	2.47	1.56	2.27	2.62	1.55	2.20
ESL/bilingual education	4.12	3.91	2.24	4.12	3.93	2.72	3.24
Arts and music	1.07	1.27	0.96	1.07	0.79	0.74	1.19
Physical education/health education	1.82	1.89	0.86	1.82	1.67	0.68	0.94
Health education	7.58	7.58	#	7.58	7.16	3.43	3.43
Physical education	1.96	2.05	0.97	1.96	1.84	0.70	1.05
				1993–94			
English	1.52	1.56	0.95	1.52	1.56	0.74	1.08
Foreign language	4.85	5.35	3.73	4.85	3.65	3.41	4.98
Mathematics	1.88	1.82	1.15	1.88	2.08	1.35	1.62
Science	2.67	2.75	1.05	2.67	2.35	1.48	1.71
Biology/life science	4.44	4.36	1.37	4.44	4.57	1.84	2.37
Physical science	2.59	2.60	0.21	2.59	3.12	2.02	2.01
Social science (including history)	1.66	1.88	1.20	1.66	1.59	0.99	1.56
ESL/bilingual education	3.39	3.24	0.76	3.39	5.52	4.99	4.93
Arts and music	0.71	1.41	1.16	0.71	0.57	0.49	1.21
Physical education/health education	1.17	1.44	0.83	1.17	1.11	0.65	1.06
				1990–91			
English	1.63	1.80	0.70	1.63	1.42	0.76	1.04
Foreign language	4.40	6.02	5.49	4.40	4.57	1.95	6.31
Mathematics	2.13	1.98	0.88	2.13	2.15	1.17	1.26
Science	2.65	2.65	1.01	2.65	2.57	0.91	1.28
Biology/life science	3.99	3.83	0.67	3.99	4.05	2.54	2.57
Physical science	3.71	3.12	2.11	3.71	5.08	3.96	4.33
Social science (including history)	2.11	2.18	0.95	2.11	2.12	0.85	1.25
ESL/bilingual education	3.53	3.22	1.58	3.53	3.90	2.52	2.87
Arts and music	0.60	1.18	1.22	0.60	0.56	0.18	1.21
Physical education/health education	1.25	1.44	0.97	1.25	0.74	0.80	1.21
				1987–88			
English	1.54	1.59	0.53	1.54	1.59	0.68	0.84
Mathematics	1.98	2.04	0.62	1.98	1.88	1.28	1.35
Science	2.15	2.01	0.82	2.15	1.96	0.91	1.13
Biology/life science	4.81	4.91	1.44	4.81	4.58	2.36	3.02
Physical science	3.56	3.27	1.04	3.56	3.49	2.31	2.46
Social science (including history)	1.55	1.76	0.67	1.55	1.44	0.48	0.73
ESL/bilingual education	3.15	2.51	1.30	3.15	3.12	2.15	2.29
Arts and music	0.83	1.05	0.67	0.83	0.79	0.19	0.72
Physical education/health education	0.93	1.33	0.81	0.93	0.86	0.35	0.85

NOTE: Middle level teachers include teachers who taught students in grades 5–9 and did not teach any students in grades 10–12; teachers who taught in grades 5–9 who identified themselves as elementary or special education teachers were classified as elementary level teachers. Not all assignment areas were measured in each SASS administration.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 "Public Teacher Survey," 1990–91 "Public Teacher Survey," 1993–94 "Public Teacher Survey," 1999–2000 "Public Teacher Survey," and 1999–2000 "Public Charter Teacher Survey."

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Table C–13.—Standard errors for table B–12: percentage of public school teachers who taught high school grades (9–12) with an undergraduate or graduate major or minor and certification in their main assignment field, by main assignment field: 1987–88 to 1999–200

	Major/minor in field			No major/minor in field			Total
	Total	Certified	Not certified	Total	Certified	Not certified	Certified
				1999–2000			
English	0.57	0.76	0.56	0.57	0.54	0.27	0.63
Foreign language	1.62	1.52	0.82	1.62	1.43	0.70	0.88
Mathematics	0.78	0.81	0.51	0.78	0.69	0.42	0.67
Science	0.79	1.05	0.66	0.79	0.73	0.36	0.78
Biology/life science	1.45	1.57	0.81	1.45	1.28	0.78	1.14
Physical science	1.59	1.65	0.83	1.59	1.50	0.88	1.13
Chemistry	2.64	2.95	1.26	2.64	2.41	1.17	1.82
Geology/earth/space science	3.77	4.07	1.79	3.77	3.70	2.99	3.58
Physics	3.51	4.09	2.13	3.51	3.68	1.66	2.77
Social science (including history)	0.71	0.88	0.56	0.71	0.62	0.25	0.62
ESL/bilingual education	3.18	3.42	1.94	3.18	3.22	2.46	3.16
Arts and music	0.55	1.03	0.75	0.55	0.47	0.34	0.83
Physical education/health education	0.85	0.98	0.56	0.85	0.76	0.29	0.64
Health education	2.88	2.99	1.53	2.88	2.57	1.26	2.03
Physical education	1.04	1.07	0.54	1.04	0.98	0.23	0.59
				1993–94			
English	0.56	0.67	0.36	0.56	0.50	0.25	0.43
Foreign language	1.21	1.34	0.63	1.21	1.09	0.40	0.69
Mathematics	0.72	0.94	0.54	0.72	0.61	0.35	0.60
Science	0.57	0.83	0.64	0.57	0.58	0.23	0.68
Biology/life science	1.29	1.42	0.61	1.29	1.24	0.40	0.76
Physical science	1.54	1.57	0.49	1.54	1.51	0.82	0.87
Chemistry	2.59	2.55	0.79	2.59	2.53	0.94	1.22
Geology/earth/space science	3.88	3.34	1.47	3.88	4.14	1.69	1.99
Physics	3.40	3.51	1.76	3.40	3.47	1.02	2.07
Social science (including history)	0.60	0.76	0.47	0.60	0.55	0.24	0.57
ESL/bilingual education	3.72	3.19	1.47	3.72	4.83	5.01	5.24
Arts and music	0.56	0.92	0.78	0.56	0.41	0.31	0.85
Physical education/health education	0.68	0.97	0.63	0.68	0.54	0.56	0.89
				1990–91			
English	0.66	0.84	0.46	0.66	0.62	0.30	0.56
Foreign language	2.24	2.32	1.12	2.24	2.14	0.54	1.20
Mathematics	1.52	1.60	0.67	1.52	1.40	0.43	0.96
Science	0.68	0.80	0.65	0.68	0.65	0.17	0.64
Biology/life science	1.69	1.89	0.83	1.69	1.64	0.19	0.83
Physical science	2.03	1.93	0.68	2.03	2.11	0.87	1.05
Chemistry	2.82	2.90	0.85	2.82	2.77	0.72	1.12
Geology/earth/space science	5.49	#	#	5.49	4.38	3.82	3.94
Physics	5.30	4.81	1.74	5.30	5.19	2.38	2.92
Social science (including history)	0.58	0.94	0.69	0.58	0.56	0.16	0.72
ESL/bilingual education	3.67	3.76	1.33	3.67	4.27	3.33	3.50
Arts and music	0.65	1.35	1.15	0.65	0.54	0.33	1.21
Physical education/health education	0.66	1.03	0.70	0.66	0.66	0.20	0.72
				1987–88			
English	0.79	0.88	0.44	0.79	0.77	0.21	0.46
Mathematics	0.92	0.89	0.66	0.92	0.79	0.45	0.68
Science	0.74	0.88	0.63	0.74	0.63	0.24	0.62
Biology/life science	1.65	1.74	0.77	1.65	1.68	0.27	0.77
Physical science	2.04	2.12	0.70	2.04	2.05	1.15	1.22
Chemistry	3.66	3.69	0.72	3.66	3.26	1.09	1.03
Geology/earth/space science	4.96	4.51	1.60	4.96	5.01	3.47	3.93
Physics	4.15	4.27	2.15	4.15	4.79	1.70	2.47
Social science (including history)	0.70	0.79	0.51	0.70	0.70	0.21	0.53
ESL/bilingual education	3.54	3.47	1.56	3.54	4.40	3.63	4.11
Arts and music	0.94	0.85	0.75	0.94	0.92	0.14	0.72
Physical education/health education	0.83	0.96	0.69	0.83	0.81	0.19	0.72

# Too few sample cases for a reliable estimate

NOTE: High school teachers include all teachers who taught any of grades 10–12, as well as teachers who taught grade 9 and no other grades. Not all assignment areas were measured in each SASS administration.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 "Public Teacher Survey," 1990–91 "Public Teacher Survey," 1993–94 "Public Teacher Survey," 1999–2000 "Public Teacher Survey," and 1999–2000 "Public Charter Teacher Survey."

Table C-14.—Standard errors for table B-13: percentage of public school middle level teachers with an undergraduate or graduate major or minor and certification in any course taught, by course subject area: 1987–88 to 1999–2000

	Major/minor in field			No major/minor in field			Total Certified
	Total	Certified	Not certified	Total	Certified	Not certified	
1999–2000							
English	1.67	1.66	0.89	1.67	1.59	1.40	1.64
Foreign language	4.06	3.81	3.11	4.06	2.91	3.07	3.87
Mathematics	2.06	1.98	0.65	2.06	1.68	1.71	1.66
Science	2.10	2.01	1.25	2.10	2.08	1.91	2.07
Biology/life science	4.09	3.41	2.48	4.09	3.02	4.16	3.95
Physical science	2.38	2.16	0.96	2.38	3.07	3.12	2.94
Social science	2.08	2.06	1.50	2.08	1.97	1.94	2.23
History	2.84	2.59	1.47	2.84	3.15	2.69	3.07
ESL	4.61	4.39	2.44	4.61	3.72	4.01	4.34
Arts and music	1.49	1.05	1.07	1.49	0.61	1.32	1.76
Physical education/health education	1.92	1.97	0.98	1.92	1.52	1.23	1.43
Health education	4.66	4.58	1.51	4.66	4.65	4.35	4.30
Physical education	2.14	2.40	1.10	2.14	1.07	1.07	1.50
1993–94							
English	1.39	1.39	0.96	1.39	1.33	1.27	1.52
Foreign language	4.51	4.97	3.49	4.51	2.06	4.29	4.65
Mathematics	1.56	1.48	0.97	1.56	1.33	1.54	1.56
Science	2.24	2.35	0.82	2.24	2.07	1.23	1.40
Biology/life science	4.11	3.33	2.44	4.11	4.00	3.00	3.15
Physical science	2.74	2.63	0.72	2.74	3.20	2.83	2.87
Social science	2.08	2.00	1.68	2.08	1.69	1.97	2.37
History	3.06	2.73	1.56	3.06	3.13	2.96	2.72
ESL	4.97	5.88	2.24	4.97	5.73	5.65	5.90
Arts and music	2.04	2.20	1.11	2.04	1.19	1.74	1.90
Physical education/health education	2.14	2.24	1.43	2.14	1.48	1.82	1.91
1990–91							
English	1.77	1.81	1.01	1.77	1.23	1.49	1.80
Foreign language	5.72	4.91	3.88	5.72	3.77	4.17	4.20
Mathematics	1.94	1.74	0.82	1.94	1.55	2.13	1.87
Science	2.09	2.24	1.08	2.09	2.12	1.20	1.61
Biology/life science	3.22	2.79	2.05	3.22	3.01	3.17	3.29
Physical science	2.63	1.75	2.23	2.63	2.64	3.58	3.04
Social science	2.20	2.19	1.32	2.20	1.40	1.60	1.81
History	3.00	2.96	1.36	3.00	2.85	2.34	2.45
ESL	3.31	2.60	1.80	3.31	5.70	6.81	6.37
Arts and music	1.76	2.42	1.88	1.76	0.87	1.41	2.41
Physical education/health education	1.84	2.31	1.81	1.84	1.01	1.73	2.42
1987–88							
English	1.28	1.22	0.74	1.28	1.06	1.17	1.18
Mathematics	2.00	1.76	0.74	2.00	1.44	1.56	1.44
Science	2.02	1.79	1.03	2.02	1.42	1.40	1.46
Biology/life science	2.97	3.36	2.01	2.97	2.03	3.45	3.80
Physical science	2.49	1.69	2.08	2.49	2.39	2.25	2.14
Social science	1.75	1.87	1.16	1.75	1.03	1.66	1.66
History	2.27	2.19	1.19	2.27	2.32	2.23	2.36
ESL	5.88	5.72	2.97	5.88	4.30	6.09	5.68
Arts and music	0.89	1.39	0.81	0.89	0.68	0.81	1.18
Physical education/health education	1.20	1.50	0.98	1.20	0.79	1.19	1.36

NOTE: Middle level teachers include teachers who taught students in grades 5–9 and did not teach any students in grades 10–12; teachers who taught in grades 5–9 who identified themselves as elementary or special education teachers were classified as elementary level teachers. Not all assignment areas were measured in each SASS administration.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 "Public Teacher Survey," 1990–91 "Public Teacher Survey," 1993–94 "Public Teacher Survey," 1999–2000 "Public Teacher Survey," and 1999–2000 "Public Charter Teacher Survey."

Table C-15.—Standard errors for table B-14: percentage of public high school grades (9–12) teachers with an undergraduate or graduate major or minor and certification in any course taught, by course subject area: 1987–88 to 1999–2000

	Major/minor in field			No major/minor in field			
	Total	Certified	Not certified	Total	Certified	Not certified	Total Certified
				1999–2000			
English	0.69	0.78	0.61	0.69	0.46	0.55	0.73
Foreign language	1.57	1.50	0.69	1.57	1.14	0.99	1.06
Mathematics	0.80	0.80	0.51	0.80	0.58	0.69	0.83
Science	0.98	1.11	0.67	0.98	0.70	0.71	0.94
Biology/life science	1.35	1.39	0.96	1.35	1.05	1.07	1.35
Physical science	1.31	1.45	0.76	1.31	1.16	1.03	1.22
Chemistry	1.93	2.32	1.47	1.93	1.79	1.43	2.01
Geology/earth/space science	2.00	1.89	1.18	2.00	2.14	2.51	2.56
Physics	2.12	2.28	1.56	2.12	2.04	2.07	2.39
Social science	0.80	0.93	0.67	0.80	0.55	0.50	0.84
History	1.13	1.09	0.51	1.13	1.17	0.68	1.06
ESL	2.71	2.65	1.77	2.71	2.84	3.01	3.18
Arts and Music	1.02	1.35	0.88	1.02	0.60	0.81	1.20
Physical education/health education	0.98	1.16	0.82	0.98	0.66	0.84	1.08
Health education	2.02	2.10	1.10	2.02	1.61	1.90	2.28
Physical education	1.10	1.33	1.10	1.10	0.77	0.86	1.22
				1993–94			
English	0.66	0.82	0.41	0.66	0.44	0.52	0.69
Foreign language	1.44	1.40	0.63	1.44	1.03	1.16	1.21
Mathematics	0.87	1.01	0.41	0.87	0.50	0.72	0.87
Science	0.69	0.97	0.63	0.69	0.44	0.67	0.84
Biology/life science	1.17	1.34	0.66	1.17	0.93	0.94	1.13
Physical science	0.99	1.18	0.67	0.99	1.11	0.84	1.07
Chemistry	1.97	2.03	0.93	1.97	1.89	1.30	1.63
Geology/earth/space science	2.25	2.15	0.76	2.25	2.38	2.15	2.20
Physics	1.94	1.64	1.16	1.94	2.17	1.79	1.92
Social science	0.70	0.85	0.60	0.70	0.46	0.50	0.80
History	1.34	1.26	0.55	1.34	1.37	0.75	0.94
ESL	2.85	2.50	1.31	2.85	3.43	2.52	2.98
Arts and Music	1.03	1.21	0.77	1.03	0.59	0.85	1.14
Physical education/health education	0.84	1.04	0.75	0.84	0.61	0.80	1.03
				1990–91			
English	1.03	0.99	0.56	1.03	0.45	1.04	0.99
Foreign language	1.83	1.86	1.43	1.83	1.80	1.09	1.71
Mathematics	1.09	1.27	0.77	1.09	0.61	1.10	1.28
Science	0.84	0.92	0.81	0.84	0.58	0.75	1.01
Biology/life science	1.57	1.68	1.79	1.57	1.29	1.06	1.89
Physical science	1.74	1.51	1.31	1.74	1.08	1.53	1.50
Chemistry	2.15	2.38	1.51	2.15	1.97	1.88	2.32
Geology/earth/space science	2.92	2.48	1.44	2.92	1.94	3.07	2.72
Physics	2.87	2.44	2.00	2.87	2.69	3.24	3.32
Social science	0.85	1.33	1.21	0.85	0.43	0.72	1.23
History	1.48	1.62	0.94	1.48	1.19	1.06	1.33
ESL	2.75	2.42	1.64	2.75	3.62	4.16	4.47
Arts and Music	1.29	1.44	1.14	1.29	0.48	1.16	1.34
Physical education/health education	1.72	1.76	1.42	1.72	0.51	1.53	1.71
				1987–88			
English	0.88	1.02	0.76	0.88	0.51	0.78	0.86
Mathematics	1.05	1.12	0.57	1.05	0.59	0.91	1.00
Science	1.05	1.21	0.73	1.05	0.47	0.88	0.96
Biology/life science	1.90	2.02	1.54	1.90	1.34	1.56	1.77
Physical science	1.36	1.35	0.89	1.36	1.02	1.28	1.29
Chemistry	2.57	2.28	1.36	2.57	2.01	1.93	1.83
Geology/earth/space science	2.90	2.60	1.45	2.90	2.25	3.16	3.09
Physics	2.15	1.72	2.25	2.15	1.54	2.34	2.06
Social science	0.92	1.00	0.79	0.92	0.55	0.91	1.05
History	1.13	1.05	0.56	1.13	1.30	1.05	1.13
ESL	2.86	2.98	1.44	2.86	3.71	5.20	5.26
Arts and Music	1.11	1.31	1.00	1.11	0.69	0.91	1.18
Physical education/health education	1.22	1.08	1.10	1.22	0.66	0.92	1.10

NOTE: High school teachers include all teachers who taught any of grades 10–12, as well as teachers who taught grade 9 and no other grades. Not all assignment areas were measured in each SASS administration.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 "Public Teacher Survey," 1990–91 "Public Teacher Survey," 1993–94 "Public Teacher Survey," 1999–2000 "Public Teacher Survey," and 1999–2000 "Public Charter Teacher Survey."

Table C–16.—Standard errors for table B–15: percentage of public school courses taught by a middle level teacher with an undergraduate or graduate major or minor and certification in the course subject area, by course subject area: 1987–88 to 1999–2000

	Major/minor in field			No major/minor in field			Total
	Total	Certified	Not certified	Total	Certified	Not certified	Certified
			1999–2000				
English	2.03	1.88	0.76	2.03	1.91	1.42	1.60
Foreign language	4.74	4.68	3.47	4.74	4.68	2.36	4.30
Mathematics	2.44	2.48	0.71	2.44	2.15	2.33	2.33
Science	2.36	2.47	1.42	2.36	2.29	1.65	2.12
Biology/life science	5.05	4.62	2.32	5.05	3.83	4.49	4.29
Physical science	2.45	2.30	0.73	2.45	3.66	3.42	3.45
Social science	2.20	2.61	1.82	2.20	2.17	1.62	2.32
History	4.22	4.11	2.25	4.22	4.54	2.51	3.47
ESL	9.30	6.03	9.53	9.30	6.13	6.89	7.91
Arts and music	1.10	1.64	1.32	1.10	0.42	1.02	1.59
Physical education/health education	1.90	2.00	1.04	1.90	1.84	0.56	1.12
Health education	7.68	7.85	0.56	7.68	5.94	4.27	4.45
Physical education	2.28	2.51	1.23	2.28	2.13	0.56	1.29
			1993–94				
English	1.59	1.73	1.08	1.59	1.62	0.82	1.37
Foreign language	4.59	5.44	4.43	4.59	2.28	4.06	5.17
Mathematics	2.15	2.12	1.44	2.15	1.95	1.66	1.86
Science	2.66	2.90	1.38	2.66	2.18	1.10	1.78
Biology/life science	4.88	4.01	3.34	4.88	4.53	2.35	3.51
Physical science	3.13	3.10	0.68	3.13	3.40	3.07	3.21
Social science	1.85	2.73	2.48	1.85	1.61	1.57	2.78
History	3.25	3.18	1.84	3.25	3.33	2.39	2.69
ESL	7.77	8.03	1.02	7.77	5.43	7.76	8.14
Arts and music	1.51	1.61	0.58	1.51	1.30	0.89	1.00
Physical education/health education	1.50	1.67	1.40	1.50	0.95	1.11	1.60
			1990–91				
English	2.04	2.11	0.93	2.04	1.60	1.29	1.61
Foreign language	6.96	6.84	2.96	6.96	6.15	3.37	4.14
Mathematics	2.03	1.95	0.74	2.03	2.04	1.63	1.40
Science	2.51	2.62	0.96	2.51	2.45	0.97	1.38
Biology/life science	3.80	3.47	2.31	3.80	3.68	3.05	3.40
Physical science	3.40	2.30	2.50	3.40	3.97	4.63	4.28
Social science	2.21	2.21	1.47	2.21	1.83	1.25	1.80
History	3.70	3.63	1.36	3.70	3.50	1.87	2.12
ESL	4.92	3.79	3.43	4.92	8.04	8.27	8.36
Arts and music	1.16	2.44	2.31	1.16	0.82	0.76	2.39
Physical education/health education	1.46	1.94	1.71	1.46	1.33	0.65	1.85
			1987–88				
English	1.50	1.58	0.72	1.50	1.38	1.06	1.22
Mathematics	2.16	2.02	0.89	2.16	1.80	1.43	1.57
Science	2.47	2.26	1.26	2.47	2.14	1.32	1.77
Biology/life science	4.18	4.94	2.56	4.18	2.82	3.91	4.58
Physical science	2.89	2.16	2.42	2.89	3.19	2.53	2.90
Social science	1.53	1.97	1.02	1.53	1.23	0.93	1.36
History	2.77	2.81	1.07	2.77	2.60	1.92	2.06
ESL	7.90	7.94	1.95	7.90	5.28	7.64	7.43
Arts and music	0.85	1.35	0.78	0.85	0.71	0.39	0.92
Physical education/health education	1.22	1.68	0.88	1.22	1.19	0.53	1.19

NOTE: Middle level teachers include teachers who taught students in grades 5–9 and did not teach any students in grades 10–12; teachers who taught in grades 5–9 who identified themselves as elementary or special education teachers were classified as elementary level teachers. Not all assignment areas were measured in each SASS administration.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 "Public Teacher Survey," 1990–91 "Public Teacher Survey," 1993–94 "Public Teacher Survey," 1999–2000 "Public Teacher Survey," and 1999–2000 "Public Charter Teacher Survey."

Table C–17.—Standard errors for table B–16: percentage of public school courses taught by a high school grades (9–12) teacher with an undergraduate or graduate major or minor and certification in the course subject area, by course subject area: 1987–88 to 1999–2000

	Major/minor in field			No major/minor in field			
	Total	Certified	Not certified	Total	Certified	Not certified	Total Certified
				1999–2000			
English	0.61	0.88	0.72	0.61	0.52	0.43	0.80
Foreign language	1.57	1.57	0.81	1.57	1.23	0.88	1.05
Mathematics	0.77	0.83	0.61	0.77	0.61	0.53	0.82
Science	0.98	1.18	0.64	0.98	0.78	0.55	0.85
Biology/life science	1.50	1.54	0.88	1.50	1.29	0.95	1.26
Physical science	1.48	1.58	0.68	1.48	1.18	0.98	1.20
Chemistry	2.39	2.70	1.00	2.39	2.19	1.46	1.83
Geology/earth/space science	3.10	3.19	1.01	3.10	3.03	3.33	3.37
Physics	2.59	2.99	1.92	2.59	2.53	2.02	2.77
Social science	0.73	0.92	0.65	0.73	0.60	0.52	0.79
History	1.35	1.30	0.53	1.35	1.34	0.78	0.94
ESL	3.79	4.45	2.62	3.79	3.84	3.44	4.37
Arts and music	0.78	1.27	0.92	0.78	0.55	0.54	1.05
Physical education/health education	0.76	1.06	0.75	0.76	0.64	0.44	0.85
Health education	2.23	2.54	1.53	2.23	2.02	1.64	2.26
Physical education	1.15	1.54	1.29	1.15	1.04	0.61	1.27
				1993–94			
English	0.60	0.82	0.42	0.60	0.52	0.32	0.60
Foreign language	1.62	1.59	0.76	1.62	1.23	1.21	1.29
Mathematics	0.87	1.05	0.55	0.87	0.55	0.72	0.87
Science	0.64	0.99	0.74	0.64	0.58	0.25	0.80
Biology/life science	1.34	1.54	0.80	1.34	1.26	0.59	1.10
Physical science	1.32	1.57	0.72	1.32	1.38	0.80	1.06
Chemistry	2.59	2.5[illegible]	0.57	2.59	2.12	1.31	1.41
Geology/earth/space science	3.86	3.36	1.77	3.86	3.53	2.46	2.43
Physics	3.49	3.31	1.32	3.49	3.52	1.86	2.07
Social science	0.62	0.97	0.68	0.62	0.57	0.41	0.89
History	1.44	1.45	0.76	1.44	1.37	0.85	1.15
ESL	4.23	3.99	1.93	4.23	4.25	3.07	3.63
Arts and music	0.98	1.12	0.95	0.98	0.73	0.50	1.01
Physical education/health education	0.89	1.36	0.90	0.89	0.59	0.73	1.24
				1990–91			
English	0.68	0.80	0.49	0.68	0.54	0.49	0.63
Foreign language	1.87	1.86	1.16	1.87	1.88	1.07	1.42
Mathematics	0.96	1.47	0.83	0.96	0.76	0.88	1.41
Science	0.76	0.81	0.72	0.76	0.67	0.38	0.73
Biology/life science	1.86	1.93	1.57	1.86	1.75	0.62	1.66
Physical science	2.16	2.21	1.07	2.16	1.54	1.62	1.76
Chemistry	3.35	3.59	1.39	3.35	2.90	1.44	1.96
Geology/earth/space science	4.58	4.48	1.45	4.58	3.59	4.24	4.19
Physics	3.99	3.91	2.35	3.99	3.59	3.24	3.97
Social science	0.67	1.35	1.09	0.67	0.55	0.44	1.22
History	1.96	2.00	0.94	1.96	1.64	1.11	1.48
ESL	2.75	2.64	1.56	2.75	4.56	4.73	5.03
Arts and music	0.73	1.44	1.29	0.73	0.52	0.46	1.35
Physical education/health education	0.71	1.18	1.01	0.71	0.57	0.51	1.11
				1987–88			
English	0.78	0.82	0.49	0.78	0.58	0.58	0.63
Mathematics	0.97	1.06	0.66	0.97	0.79	0.58	0.80
Science	0.89	1.09	0.84	0.89	0.63	0.65	0.90
Biology/life science	2.08	2.20	1.85	2.08	1.81	1.13	1.84
Physical science	1.96	1.88	1.08	1.96	1.30	1.52	1.61
Chemistry	3.38	3.33	1.01	3.38	2.63	1.93	2.21
Geology/earth/space science	4.31	4.25	1.37	4.31	3.09	4.49	4.72
Physics	3.48	2.83	3.40	3.48	2.72	3.62	3.77
Social science	0.83	1.06	0.63	0.83	0.66	0.61	0.79
History	1.45	1.34	0.53	1.45	1.59	1.10	1.12
ESL	6.34	6.77	1.14	6.34	6.52	7.12	7.57
Arts and music	0.77	1.49	1.48	0.77	0.72	0.29	1.48
Physical education/health education	1.12	1.22	1.38	1.12	0.85	0.55	1.24

NOTE: High school teachers include all teachers who taught any of grades 10–12, as well as teachers who taught grade 9 and no other grades. Not all assignment areas were measured in each SASS administration.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 "Public Teacher Survey," 1990–91 "Public Teacher Survey," 1993–94 "Public Teacher Survey," 1999–2000 "Public Teacher Survey," and 1999–2000 "Public Charter Teacher Survey."

Table C–18.—Standard errors for table B–17: percentage of public school students that were taught by a middle level teacher with an undergraduate or graduate major or minor and certification in the course subject area, by course subject area: 1987–88 to 1999–2000

	Major/minor in field			No major/minor in field			
	Total	Certified	Not certified	Total	Certified	Not certified	Total Certified
			1999–2000				
English	2.15	2.03	0.64	2.15	1.99	1.39	1.50
Foreign language	4.60	4.76	3.49	4.60	4.19	2.97	4.53
Mathematics	2.46	2.65	0.84	2.46	2.31	2.28	2.42
Science	2.49	2.53	1.51	2.49	2.35	1.61	2.06
Biology/life science	5.58	5.08	2.44	5.58	3.97	4.87	4.64
Physical science	2.92	2.82	0.67	2.92	3.80	3.62	3.63
Social science	2.56	2.97	1.84	2.56	2.65	1.65	2.49
History	4.50	4.36	2.26	4.50	4.96	2.56	3.58
ESL/bilingual education	7.29	5.85	5.49	7.29	4.73	7.44	6.75
Arts and music	0.73	1.44	1.27	0.73	0.41	0.57	1.38
Physical education/health education	2.36	2.49	1.39	2.36	2.32	0.57	1.42
Health education	7.98	8.10	0.53	7.98	6.74	4.09	4.25
Physical education	2.73	3.00	1.56	2.73	2.63	0.57	1.59
			1993–94				
English	1.65	1.58	1.20	1.65	1.63	1.02	1.45
Foreign language	4.71	5.95	4.27	4.71	2.47	3.66	5.01
Mathematics	1.90	1.86	1.31	1.90	1.75	1.49	1.66
Science	2.62	2.81	1.23	2.62	2.19	1.27	1.73
Biology/life science	4.60	3.74	3.46	4.60	4.31	2.08	3.44
Physical science	3.14	3.10	0.65	3.14	3.48	2.95	3.10
Social science	1.87	2.70	2.41	1.87	1.56	1.66	2.77
History	3.13	3.01	1.85	3.13	3.22	2.53	2.70
ESL/bilingual education	8.60	9.58	1.48	8.60	5.79	7.06	7.82
Arts and music	1.49	1.70	0.68	1.49	1.39	0.70	0.99
Physical education/health education	1.61	1.64	1.17	1.61	1.19	1.07	1.39
			1990–91				
English	1.94	1.91	0.89	1.94	1.49	1.21	1.41
Foreign language	6.32	6.30	2.96	6.32	4.78	3.45	4.04
Mathematics	2.00	1.87	0.76	2.00	1.86	1.70	1.43
Science	2.33	2.44	0.97	2.33	2.32	0.79	1.24
Biology/life science	3.59	3.34	2.04	3.59	3.53	2.72	3.03
Physical science	3.29	2.24	2.45	3.29	3.82	4.51	4.17
Social science	2.12	2.15	1.07	2.12	1.77	1.17	1.53
History	3.43	3.38	1.20	3.43	3.28	1.77	1.99
ESL/bilingual education	3.95	3.43	2.13	3.95	7.32	7.74	7.59
Arts and music	1.11	2.45	2.30	1.11	0.86	0.68	2.40
Physical education/health education	1.58	1.90	1.53	1.58	1.44	0.76	1.78
			1987–88				
English	1.43	1.47	0.71	1.43	1.27	1.06	1.16
Mathematics	2.06	1.94	0.85	2.06	1.60	1.38	1.47
Science	2.12	1.92	0.95	2.12	1.86	1.13	1.30
Biology/life science	4.00	4.70	2.38	4.00	2.66	3.79	4.42
Physical science	2.93	2.17	2.41	2.93	3.09	2.33	2.67
Social science	1.54	1.84	0.85	1.54	1.26	0.99	1.23
History	2.49	2.56	0.90	2.49	2.64	1.77	1.86
ESL/bilingual education	8.20	8.53	2.23	8.20	5.45	6.26	6.24
Arts and music	0.72	1.24	0.84	0.72	0.65	0.35	0.93
Physical education/health education	0.93	1.38	0.71	0.93	0.88	0.54	1.02

NOTE: Middle level teachers include teachers who taught students in grades 5–9 and did not teach any students in grades 10–12; teachers who taught in grades 5–9 who identified themselves as elementary or special education teachers were classified as elementary level teachers. Not all assignment areas were measured in each SASS administration.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 "Public Teacher Survey," 1990–91 "Public Teacher Survey," 1993–94 "Public Teacher Survey," 1999–2000 "Public Teacher Survey," and 1999–2000 "Public Charter Teacher Survey."

Table C–19.—Standard errors for table B–18: percentage of public school students that were taught by a high school grades (9–12) teacher with an undergraduate or graduate major or minor and certification in the course subject area, by course subject area: 1987–88 to 1999–2000

	Major/minor in field			No major/minor in field			
	Total	Certified	Not certified	Total	Certified	Not certified	Total Certified
1999–2000							
English	0.57	0.89	0.72	0.57	0.54	0.37	0.83
Foreign language	1.63	1.74	0.94	1.63	1.29	0.96	1.26
Mathematics	0.84	0.88	0.65	0.84	0.68	0.51	0.82
Science	1.14	1.32	0.72	1.14	1.00	0.49	0.85
Biology/life science	1.59	1.77	1.03	1.59	1.40	0.91	1.36
Physical science	1.59	1.68	0.70	1.59	1.32	0.96	1.17
Chemistry	2.43	2.72	1.04	2.43	2.35	1.29	1.71
Geology	3.36	3.50	1.02	3.36	3.62	3.20	3.42
Physics	2.73	3.37	1.98	2.73	2.86	1.86	2.82
Social science	0.83	1.04	0.69	0.83	0.75	0.49	0.80
History	1.38	1.36	0.55	1.38	1.43	0.72	0.92
ESL/bilingual education	4.35	5.06	3.17	4.35	4.01	3.59	4.78
Arts and music	0.76	1.28	0.93	0.76	0.55	0.57	1.08
Physical education/health education	0.81	1.12	0.78	0.81	0.69	0.43	0.87
Health education	2.34	2.64	1.32	2.34	2.12	1.79	2.29
Physical education	1.03	1.63	1.43	1.03	0.87	0.63	1.44
1993–94							
English	0.58	0.76	0.38	0.58	0.48	0.37	0.58
Foreign language	1.40	1.43	0.70	1.40	1.19	0.84	0.99
Mathematics	0.83	1.01	0.47	0.83	0.51	0.70	0.85
Science	0.64	1.00	0.74	0.64	0.57	0.32	0.83
Biology/life science	1.22	1.50	0.84	1.22	1.20	0.66	1.24
Physical science	1.23	1.46	0.67	1.23	1.34	0.81	1.04
Chemistry	2.52	2.52	0.56	2.52	2.14	1.34	1.49
Geology	3.51	2.91	1.72	3.51	3.34	2.46	2.38
Physics	2.95	2.87	1.15	2.95	3.29	1.62	1.90
Social science	0.68	0.93	0.64	0.68	0.58	0.43	0.85
History	1.41	1.38	0.75	1.41	1.35	0.86	1.14
ESL/bilingual education	3.60	3.32	1.57	3.60	3.57	2.49	2.99
Arts and music	0.94	1.09	0.82	0.94	0.61	0.67	1.00
Physical education/health education	0.69	1.12	0.74	0.69	0.55	0.46	0.94
1990–91							
English	0.73	0.78	0.54	0.73	0.52	0.65	0.68
Foreign language	1.96	1.96	1.15	1.96	1.96	0.98	1.46
Mathematics	0.94	1.27	0.76	0.94	0.63	0.89	1.24
Science	0.77	0.78	0.71	0.77	0.65	0.51	0.77
Biology/life science	1.78	1.92	1.27	1.78	1.69	0.74	1.48
Physical science	1.76	1.70	1.10	1.76	1.31	1.43	1.56
Chemistry	2.40	2.55	1.31	2.40	2.37	1.37	1.80
Geology	4.13	3.99	1.48	4.13	2.98	3.76	3.89
Physics	3.46	3.22	2.02	3.46	3.72	2.99	3.61
Social science	0.66	1.25	1.03	0.66	0.50	0.45	1.18
History	1.74	1.84	0.95	1.74	1.46	1.03	1.42
ESL/bilingual education	2.68	2.60	1.39	2.68	4.03	4.34	4.56
Arts and music	0.83	1.44	1.23	0.83	0.47	0.60	1.34
Physical education/health education	0.81	1.25	1.08	0.81	0.60	0.59	1.17
1987–88							
English	0.82	0.94	0.55	0.82	0.55	0.61	0.73
Mathematics	1.00	1.06	0.63	1.00	0.69	0.73	0.88
Science	0.79	1.07	0.63	0.79	0.53	0.58	0.85
Biology/life science	2.01	2.04	1.24	2.01	1.73	1.13	1.45
Physical science	1.71	1.77	0.76	1.71	1.18	1.38	1.53
Chemistry	2.90	2.87	1.05	2.90	2.41	1.73	1.95
Geology	4.17	4.11	1.30	4.17	2.72	3.97	4.21
Physics	3.05	2.62	2.53	3.05	2.68	2.84	3.13
Social science	0.72	0.90	0.58	0.72	0.66	0.57	0.77
History	1.51	1.46	0.49	1.51	1.58	0.87	0.93
ESL/bilingual education	4.12	4.40	0.95	4.12	5.40	6.59	6.93
Arts and music	0.77	1.19	1.12	0.77	0.66	0.41	1.10
Physical education/health education	1.06	1.13	0.93	1.06	0.83	0.52	1.00

NOTE: High school teachers include all teachers who taught any of grades 10–12, as well as teachers who taught grade 9 and no other grades. Not all assignment areas were measured in each SASS administration.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 "Public Teacher Survey," 1990–91 "Public Teacher Survey," 1993–94 "Public Teacher Survey," 1999–2000 "Public Teacher Survey," and 1999–2000 "Public Charter Teacher Survey."

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